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THE FOUNDRY is published monthly by The Penton Publishing Co., Penton Building 1213 West Third street, Cleveland, Ohio. JOHN A. PENTON, Chairman, Board of Directors; E. L. SHANER, President and Treasurer; J. R. DAWLEY and G. O. HAYS, Vice-Presidents; F. G. STEINEBACH, Secretary

Subscription: United States, Canada and Mexico. $2.00 a year, Great Britain and other Foreign Countries, $4.00 a year; single copies, 25 cents. Copies published three months or more previous to date of current issue, 50 cents each. Entered as second class matter at postoffice at Cleveland under the act of March 3, 1879.

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Member: Audit Bureau of Circulations, Associated Business Papers, National Publishers Association.

May, 1938

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THE FOUNDRY is indebted to the Cleveland Convention & Visitors Bureau for the photographs of Cleveland scenes reproduced in this issue, to E. L. Jarboe for the illustration on page 59 and to Trout-Ware Inc. for co-operation in preparing many of the photographs of Cleveland committee members

Welcome to May 14-19

After all, profit

Linoil is used by thousands of foundrymen because it helps them to make cored castings at a lower cost. And, what better reason?

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NEWARK, N. J.

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The Foundry Editorial

Progress Is Keynote as A. F. A. Prepares for Cleveland

THE foundry industry should find inspiration for future progress in the coming Cleveland convention and exhibition of the American Foundrymen's association, with its multiplicity of educational and entertainment features. Advance information predicts one of the finest foundry shows in history, perhaps the best balanced program yet presented, with excellence of technical papers the dominant feature, and an attendance record which may surpass the total registration at the 1930 Cleveland meeting.

Complete reversal of the business cycle since the Milwaukee convention and exhibition a year ago accentuates greatly the necessity for complete knowledge of latest developments in machines, materials and fundamentals of practice. Progressive management realizes modern methods are essential today in meeting competition of other engineering materials. Likewise it must be recognized that when fear psychology is overcome by faith in America and its institutions, and tomorrow brings a quickening in the business pulse, production demands will be met most successfully by those companies making preparations now. Considering the small cost involved, foundries can well afford to have all key men see the Cleveland Foundry Show and participate in the technical sessions pertaining to their particular fields.

Activities of convention week represent the work of hundreds of men in all branches of the foundry, equipment and supply industries. Members of various association committees have co-operated with the technical staff to provide a comprehensive program in which approximately 200 individuals will participate in formal presentations. Special entertainment features have been arranged by over 250 men and women serving on committees of the Northeastern Ohio Chapter of the A.F.A. Well in excess of 200 manufacturers of foundry equipment and supplies have contributed heavily in time and money to make the Foundry Show the best in history. Culmination of these individual and collective endeavors presents a significant opportunity for all classes of foundrymen.

Enthusiasm developed by local chapters during the past four years has proved an important factor in contributing to foundry progress and has aroused widespread interest in the annual conventions. In fourteen chapters, which include a majority of association members, several hundred men are serving as officers, directors and members of various committees to further the work of the A.F.A. Contributions of these men should help the American Foundrymen's association in its objective "To promote the arts and sciences applicable to metal casting manufacture and to improve methods of production and quality of castings to the end that increasing utility of all classes of castings may result advantageously to all persons engaged in the foundry and related industries and to all users of foundry products."

Eye Hazards Are Costly

APPROXIMATELY fifty million dollars could be saved each year by American industries if known methods of eliminating eye accident hazards were followed conscientiously by employers and employes, according to the National Society for the Prevention of Blindness. Industrial hazards result from accidents, disease and excessive eye fatigue.

Accident hazards may be prevented in the following three ways: By providing protective equipment, such as goggles and head masks for individual workmen, screens of metal, wood or canvas between workmen, and shields or other approved protective devices at the point of operation of grinding wheels and other machines; by revising the process, redesigning tools and machines, and rearranging machines and other plant equipment; and by rules of work, supervision, and education in safe practices of workmen and foremen.

Quite aside from humanitarian aspects, it would be cheaper for industry to prevent accidents than to pay for them.

Frank G. Steinebach
Editor

Northeastern Ohio Invites American Foundrymen

THE annual convention and exhibition of the American Foundrymen's association, to be held in Cleveland's beautiful Public Auditorium and spacious underground Exhibition Hall, May 14 to 19, marks the fifth time in history that those interested in the production of castings have gathered on the shores of Lake Erie to review progress of the past year and to visualize improvements of the future. Cleveland, one of the largest foundry centers, welcomes the opportunity of again playing host to the foundry, equipment and supply industries of America.

For the third consecutive year the convention is staged at the invitation of a chapter of the A.F.A. Organized three years ago as the second group under the sponsorship of the association, the Northeastern Ohio Chapter of the American Foundrymen's Association has made a substantial contribution to the foundry interests of the district as well as to the parent body. For several months, enthusiastic committees of the chapter, under the direction of Bertram G. Parker, Youngstown Foundry & Machine Co., Youngstown, O., as general chairman, have planned numerous special attractions of convention week, such as ladies entertainment, plant visitation, stag party, annual banquet, special Northeastern Ohio day, housing and golf.

Convention visitors usually consider plant visitation an important feature of the program. In Cleveland, the following plants will be available for inspection at certain definite times during convention week: Allyne-Ryan Foundry Co.; Cleveland Co-Operative Stove Co.; Cleveland Trade school; Crucible Steel Castings Co.; Eberhard Mfg. Co., division of Eastern Malleable Iron Co.; Ferro Machine & Foundry Co.; Forest City Foundries Co.; Fulton Foundry & Machine Co.; Gluntz Brass Foundry Co.; Hill Clutch Machine & Foundry Co.; Lake City Malleable Co.; Ohio Brass Co., Mansfield, O.; Republic Steel Corp.; W. S. Tyler Co.; Wellman Bronze & Aluminum Co.; West Steel Castings Co.; and Westinghouse Electric & Mfg. Co. A special visit to the new

Chapter

strip mill of the Republic Steel Corp. has been arranged for Tuesday morning. Detailed information on plant visitation schedules and directions for reaching the various plants open for inspection will be available at plant visitation committee headquarters in the convention registration booth.

An outstanding feature of the special convention entertainment is the annual stag party to be held in Music Hall and Public Auditorium on Tuesday evening, May 17. Plans for the largest gathering of foundrymen ever held are under a joint committee of the Northeastern Ohio chapter of the A.F.A. and the Foundry Equipment Manufacturers' association, with Leroy P. Robinson, Werner G. Smith Co., Cleveland, as chairman and Arthur J. Tuscany, Foundry Equipment Manufacturers' association, as vice chairman. A large group of representative foundrymen and equipment and supply representatives are assisting with the committee work. Remarkable success of stag parties at recent conventions in both Detroit and Milwaukee indicate the interest which may be expected in the Cleveland party.

The first part of the program, a stupendous show in Music Hall, will get under way shortly after 8 o'clock. Those in charge are making every effort to provide the finest entertainment feature ever presented to a foundry convention group. Talent has been selected from the leading theaters and night clubs. Immediately following the stage entertainment, a fine buffet supper will be served in the main arena of Public auditorium. Tickets for the stag party may be secured from the committee headquarters, Suite 632, 1213 West Third street, Cleveland, from the American Foundrymen's association, or from any committee member.

The golf committee, with Joseph H. Bruce, Bowler Foundry Co., as chairman and M. J. Sweeney, Allyne-Ryan Foundry Co., as vice chairman, has arranged with a number of clubs in various sections of Cleveland and the surrounding territory to extend playing privileges to those attending the convention. Complete information on the courses available may be secured from members of the golf committee at the registration booth in the Public auditorium.

An exceptionally attractive program of entertainment has been arranged for the ladies attending the convention. Plans have been prepared by a committee with the following officers: B. R. Pearse, Atlas Foundry Co., general chairman; Mrs. Arthur J. Tuscany,

Convention Activities Timetable

Saturday, May 14

Exhibits Open, Northeastern Ohio Day, 1:00 p.m.

Monday, May 16

Opening meeting, 9:00 a.m.
Gray Cast Iron, 10:00 a.m.
Nonferrous Founding, 10:00 a.m.
Chapter Conference Luncheon, 12:30 p.m.
Committee on Refractories Luncheon, 12:30 p.m.
Fluidity Tests Committee Luncheon, 12:30 p.m.
Foreman Training, 2:00 p.m.
Pattern Making, 2:00 p.m.
Gray Cast Iron, 2:00 p.m.
Cast Iron Shop Course, 4:00 p.m.
Engineering Instructors' Dinner, 6:30 p.m.
Foundry Refractories, 8:00 p.m.
Job Evaluation, 8:00 p.m.

Tuesday, May 17

Sand Shop Practice Course, 8:30 a.m.
Nonferrous Castings, 10:00 a.m.
Steel Castings, 10:00 a.m.
Gray Cast Iron, 10:00 a.m.
Nonferrous Round Table Luncheon, 12:30 p.m.
Gray Iron Round Table Luncheon, 12:30 p.m.
Apprentice Training, 2:00 p.m.
Foundry Cost Methods, 2:00 p.m.
Steel Castings, 2:00 p.m.
Cast Iron Shop Course, 4:00 p.m.
Stag Party, Evening.

Wednesday, May 18

Sand Shop Course, 8:00 a.m.
Apprentice Training Demonstration, 9:00 a.m.
Malleable Cast Iron, 9:00 a.m.
Steel Castings, 9:00 a.m.
Sand Research, 9:00 a.m.
Annual Business Meeting, 11:00 a.m.
Steel Division Round Table Luncheon, 1:00 p.m.
Apprentice Committee Luncheon, 1:00 p.m.
Cast Iron Shop Course, 4:00 p.m.
Malleable Iron Shop Course, 4:00 p.m.
Annual A.F.A. Dinner, Evening.

Thursday, May 19

Sand Shop Course, 8:30 a.m.
Malleable Cast Iron, 10:00 a.m.
Materials Handling, 10:00 a.m.
Malleable Round Table Luncheon, 12:30 p.m.
Foundry Safety and Hygiene, 2:00 p.m.
Cast Iron Shop Course, 4:00 p.m.
Malleable Shop Course, 4:00 p.m.

chairman; Mrs. Ralph H. West, honorary vice chairman; Mrs. R. F. Lincoln, Mrs. B. G. Parker, Mrs. B. R. Pearse, Mrs. L. P. Robinson, Mrs. F. G. Steinebach and Mrs. J. H. Tressler, vice chairmen. Special registration headquarters for the ladies will be maintained in the Cleveland hotel, and members of the committee will be on hand to give information on the entertainment features and points of interest in Cleveland.

A reception and tea will be held in the ballroom of the Hotel Cleveland, Monday, May 16 from 3 to 5 p. m. with the compliments of the American Foundrymen's association. On Tuesday, May 17, the ladies will leave the Hotel Cleveland at 10 a. m. in busses for a sightseeing trip and a visit to the Cleveland Museum of Art. The party then will be taken from the museum to Shaker tavern where luncheon will be served. In the afternoon, the group will visit the General Electric institute at Nela Park, one of the interesting spots in Cleveland, where many types of displays and demonstrations will be provided. The electric kitchen and the residence lighting rooms, showing the latest developments in those fields, probably will be of special interest to the ladies. The party will be returned to the hotel at 4 p. m.

On Tuesday evening, a special theater party has been planned for the ladies at the Playhouse, one of the interesting showplaces of Cleveland.

Musical Entertainment Provided

A luncheon and fashion show will be held in the Higbee Co. lounge at 1 p. m. on Wednesday. As an added feature, the A Capella choir of Lakewood high school, consisting of 80 voices will furnish musical entertainment. All of the events with the exception of the tea on Monday, will be provided with the compliments of the Northeastern Ohio Chapter of the American Foundrymen's association.

The ladies' entertainment committee has accepted the suggestion of several that no planned features be arranged for Thursday, May 19 so that the ladies may have time to visit the various shopping centers and other points of interest in the city of Cleveland.

The annual dinner of the A.F.A. will be held in the ballroom of the Hotel Cleveland on Wednesday evening, May 18 at 7 p. m. The committee in charge of arrangements is being directed by Walter L. Seelbach, Forest City Foundries Co., Cleveland, as chairman and J. H. Redhead, Lake City Malleable Co., Cleveland, as vice chairman. As in the past, the program will include the presentation of the medal award of the association.

H. V. Kaltenborn, world renown traveler, radio commentator, author and columnist will be the principal speaker at the dinner. Mr. Kaltenborn is well-known for his column "Kaltenborn Edits the News," published in many newspapers throughout the country, and for his radio comments under the same title. He will speak on the present European situation, knowledge of which he has gained through extensive personal observations in many European countries and through interviews with leaders of the various countries.

A reception and dance, sponsored by the Northeast-

(*Continued on page* 59)

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Crucible Steel Castings Co.
A. C. STEER
Sandusky Foundry & Machine Co., Sandusky
D. V. STEWART
Columbiana Pump Co., Columbiana
F. A. STEWART
National Malleable & Steel Castings Co.
L. L. SWIFT
Cleveland Graphite Bronze Co.
P. TOMKINS
W. O. Larson Foundry Co., Grafton
W. C. TRANSUE
Ohio Cultivator Co., Bellevue
W. E. TRUMP
Machined Steel Castings Co., Alliance
V. A. WALKER
Pitcairn Co., Barberton
GEORGE WALTON
Madison Foundry Co.
T. C. WATTS
Falcon Bronze Co., Youngstown
L. A. WAY
Columbiana Foundry Co., Columbiana
J. C. WEISENBACH
City Foundry Co.
D. T. WELLMAN
Wellman Bronze & Aluminum Co.
F. L. WOLF
Ohio Brass Co., Mansfield

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C. W. Hockman

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Mrs. R. W. Hisey

B. L. Chamberlin

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E. F. Ross

John Cleary

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G. T. Williams

R. G. Wieland

R. S. Hoffman

A. N. Farmer

D. R. James

D. T. Wellman

O. D. Conover

E. F. Hess

J. S. Wilbar

T. J. Calhoun

C. J. Nock Jr.

A. F. Anjeskay

C. J. Miller

L. H. Williston

L. A. Way

H. A. Reece

S. M. Marks

H. M. Miller

(*Continued from page* 46)

ern Ohio chapter will follow the annual dinner. Music for the dinner and dance will be furnished by Manny Landers' orchestra.

Educational possibilities of the annual meeting of the association are provided in the large exhibition of foundry equipment and supplies to be staged in the exhibition hall, and in the technical program covering a wide variety of foundry problems. Information on the exhibition and a list of the companies represented at the show are given on pages 62 and 63 of this issue.

According to Robert E. Kennedy, technical secretary of the A.F.A., the technical program to be presented in Cleveland, is the finest in quality and quantity of any prepared under association direction. The program of meetings, which is presented in detail on pages 60 and 61 of this issue of THE FOUNDRY, includes 37 sessions devoted to problems of management, technical control, production, and materials in steel, malleable, gray iron and nonferrous foundries. Management subjects include foreman training, job evaluation, apprentice training, foundry cost methods, and safety and hygiene. Meetings of general interest to all branches of the industry will discuss foundry refractories, sand research and control, materials handling and patternmaking.

Present First Lecture in Series

The Cleveland convention program includes the first of a series of special lectures to be presented under the sponsorship of the board of awards of the association. Charles R. Hook, president and general manager of the American Rolling Mill Co., Middletown, O., and president of the National Association of Manufacturers, will address the annual business meeting of the association in Music hall of the Cleveland Public Auditorium, Wednesday, May 18, at 11 a. m. Not only will this lecture appeal to visitors to the convention, but it will be of importance to all of those interested in public affairs, industry and business.

Shop operating courses, as in recent years, will provide the setting for the valuable discussion of practice problems. In Cleveland, four shop courses will be devoted to gray cast iron, three to sand and two to malleable cast iron. In addition, several round table discussions will feature the interchange of practical production information.

A dinner for engineering and shop practice instructors, to which all interested foundrymen are invited, will be held Monday evening under the auspices of the association committee on co-operation with engineering schools. The following discussions will be included; "What a Course in Metallurgy Should Teach," by Frederick G. Sefing, International Nickel Co., Bayonne, N. J., and "How Can a Foundry Course in an Engineering School Meet the Highest Requirements of an Engineering Course," by Carl H. Casberg, University of Illinois, Urbana, Ill. This meeting should give an excellent opportunity for industry and the teaching fraternity to discuss common problems.

The convention program for Cleveland has been arranged to concentrate the sessions for any one branch of the industry during two days of the meeting, with gray iron and nonferrous on Monday and Tuesday, steel on Tuesday and Wednesday and malleable on Wednesday and Thursday, while the management and general interest sessions are scattered throughout the week.

Registration headquarters for all convention visitors, with the exception of the ladies which was mentioned previously, will be maintained in the north exhibition hall of Public auditorium. All technical meetings, round table luncheons, and general sessions will be held in meeting halls located in both the north and south wings of the auditorium. The two technical sessions scheduled for Monday night will be held in the Hotel Statler.

Interesting view of the Terminal Tower as seen from the foot bridge leading to the Stadium. A portion of the Penton building, home of The Foundry, is shown on the right

Tentative Program of Cleveland Co

Saturday, May 14

1:00 p.m.—*Exhibit Opens—Northeastern Ohio Day*

Monday, May 16

9:00 a.m.—*Opening Meeting*

Presiding, President H. Bornstein

10:00 a.m.—*Gray Iron*

Chairman—Dr. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala.; vice chairman, A. W. Weston, Chicago Hardware Co., North Chicago, Ill.
Hints on Molding and Preparation of Castings for Enameling, by R. B. Schaal, Ferro Enamel Corp., Cleveland.
Relation of Microstructure to Enamelability of Cast Iron, by Dr. G. H. Spencer-Strong, Porcelain Enamel Mfg. Co., Baltimore, Md.
Classification of Graphite Size, Committee Report presented by Chairman W. E. Mahin, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.
Fluidity Tests, Committee report presented by Chairman W. H. Spencer, Sealed Power Corp., Muskegon, Mich.

10:00 a.m.—*Nonferrous Founding*

Chairman, Harold J. Roast, Canadian Bronze Co., Montreal, Canada.
Heat Treating Zinc Bronze Pressure Castings to Close Up Leakage, by H. Fleck and T. C. Bunch, Pearl Harbor Navy Yard, Honolulu, T. H.
Risers and Gates for Nonferrous Castings, by A. E. Cartwright and C. C. Brisbois, Robert Mitchell Co. Ltd., Montreal, Canada.
Fluidity of Red Brass, by Geo. P. Halliwell, H. Kramer Co., Chicago.
Annual Nonferrous Division Business Meeting.
Presiding, Division Chairman H. M. St. John.
Report of Committee on Analysis of Defects.
Report of Committee on Recommended Practice.

12:30 p.m.—*Refractories Committee Luncheon*

12:30 p.m.—*Chapter Conference Luncheon Meeting*

12:30 p.m.—*Fluidity Tests Committee Luncheon*

2:00 p.m.—*Foreman Training*

Presiding, A. D. Lynch, J. I. Case Co., Racine, Wis.
Address by A. C. Horrocks, educational director, National Association of Foremen, and Goodyear Tire & Rubber Co., Akron, O.

2:00 p.m.—*Pattern Making*

Chairman—Vaughan Reid, City Pattern Works, Detroit; vice chairman H. M. Harrold, Caterpillar Tractor Co.
Modern Pattern Production, by E. T. Kindt, Kindt-Collins Co., Cleveland.
Pattern Developments and Molding Methods, by Edward Hynans, Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich.
Pattern Making Apprenticeship Standards, by B. B. Wittfodt, Caterpillar Tractor Co., Peoria, Ill.

2:00 p.m.—*Gray Iron*

Chairman—Fred Walls, International Nickel Co., Inc., Detroit; vice chairman, Garnet Phillips, International Harvester Co., Tractor Works, Chicago, Ill.
Physical Properties of Cast Iron in Heavy Sections, by E. R. Young, V. A. Crosby, and A. J. Herzig, Climax Molybdenum Co., Detroit.
Some Effects of Blast Pressure on Cupola Operations, by C. K. Donoho and Dr. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala.
Characteristics of Cokes for Cupolas, (a review of paper originally presented before the Institute of British Foundrymen by J. G. Pearce and Dr. Hugh O'Neill). Paper reviewed and abstracted by J. A. Bowers, American Cast Iron Pipe Co., Birmingham, Ala.
Cupola Practice—by Marcel Doudouet, École Superieure de Fonderie, Paris, France. Official exchange paper presented on behalf of the French Foundry Technical association.

4:00 p.m.—*Cast Iron Shop Practice Course*

Chairman, Horace Deane, Deere & Co., Moline, Ill.
Cupola Operation, by Donald J. Reese, International Nickel Co. Inc., Bayonne, N. J.

6:30 p.m.—*Instructors' Dinner*

Chairman, Frank G. Steinebach, THE FOUNDRY, Cleveland.
Discussions:
What a Course in Metallurgy Should Teach, by Fred G. Seiling, International Nickel Co. Inc., Bayonne, N. J.
How Can a Foundry Course in An Engineering School Meet the Highest Requirements of An Engineering Course, by Carl H. Casberg, University of Illinois, Urbana, Ill.

8:00 p.m.—*Foundry Refractories*

Chairman—J. A. Bowers, American Cast Iron Pipe Co., Birmingham, Ala.; vice chairman, Elmer Carmody, Ada, Mich.
Effects of Cupola Practice on Linings, by C. K. Donoho, American Cast Iron Pipe Co., Birmingham, Ala., and Chas. F. Greene, Atlantic Refractories Co., Macon, Ga.
Characteristics of the Silica Refractories Used in the Cupola, by W. J. Rees, head refractories department, University of Sheffield, Sheffield, England (Official exchange paper presented on behalf of the Institute of British Foundrymen).
Refractories for Foundry Ladles, by C. E. Bales, Ironton Fire Brick Co., Ironton, O.

8:00 p.m.—*Job Evaluation*

Chairman—H. C. Robson, Continental Roll & Steel Foundry Co., East Chicago, Ind.; vice chairman, F. G. Wartgow, American Steel Foundries, East Chicago, Ind.
Job Evaluation for the Smaller Foundry, by E. L. Roth, Motor Casting Co., Milwaukee.
Demonstration of the Use of the Occupational Rating Plan of the Industrial Management Society, by Ralph H. Landes, Western Electric Co., Chicago.

Tuesday, May 17

8:30 a.m.—*Sand Shop Practice Course*

Chairman—D. Frank O'Connor, Walworth Co., Boston.
Practical Problems of Nonferrous Sand Control; Discussion leader—A. C. Arbogast, Northern Indiana Brass Co., Elkhart, Ind.

10:00 a.m.—*Nonferrous Castings*

Chairman—H. M. St. John, Detroit Lubricator Co., Detroit; vice chairman, Dr. R. W. Dayton, Battelle Memorial institute, Columbus, O.
The Role of Silicon in Nonferrous Castings, by Dr. H. W. Gillett, Battelle Memorial institute, Columbus, O.
A Description of the Age Hardening Process as Applied to Castings, by L. W. Kempf, research laboratories, Aluminum Co. of America, Cleveland.
Production of Castings in Age Hardenable Nickel-Tin Bronzes, by T. E. Kihlgren, International Nickel Co. Inc., Bayonne, N. J.

10:00 a.m.—*Steel Castings*

Chairman—John Howe Hall, Germantown, Philadelphia; vice chairman, W. C. Hartman, Bethlehem Steel Co.
Effects of Aluminum on the Physical Properties of Medium Carbon Cast Steel, by C. E. Sims and F. B. Dahle, Battelle Memorial institute, Columbus, O.
Report of Committee on Radiography, Presented by Committee Chairman, C. W. Briggs, Naval Research laboratory, Washington.

10:00 a.m.—*Gray Iron*

Chairman—John W. Bolton, Lunkenheimer Co., Cincinnati, O.; vice chairman, Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.
Deoxidation and Graphitization, by R. G. McElwee, Vanadium Corp. of America, Detroit.
Comparative Effects of Late Additions of Silicon and Titanium to Cast Iron, by G. F. Comstock and E. R. Starkweather, Titanium Alloy Mfg. Co., Niagara Falls.
The Formation of Graphite in Gray Iron, by Alfred Boyles, Battelle Memorial institute, Columbus, O.

12:30 p.m.—*Nonferrous Roundtable Luncheon*

Chairman—H. J. Rowe, Aluminum Co. of America.
Crucible Melting Furnace Developments, by R. H. Stone, Vesuvius Crucible Co., Swissvale, Pa.
Analysis of Causes and Remedies for Certain Types of Defective Casting.

12:30 p.m.—*Gray Iron Roundtable Luncheon*

Chairman—H. Kenneth Briggs, Western Foundry Co., Chicago; vice chairman, S. C. Massari, Association of Chilled Car Wheel Manufacturers, Chicago.
Discussion: Graphitization and Inclusions in Cast Iron.

2:00 p.m.—*Apprentice Training*

Chairman—C. J. Freund, University of Detroit, Detroit.

Of Activities For Convention

Wisconsin Training Plan, by J. E. Tepoorten, coordinator, Occupational Extension service, Wisconsin Vocational schools, Madison, Wis.
Foundry Apprenticeship in a Commercial Shop, by E. N. Brough, Fairbanks, Morse & Co., St. Johnsbury, Vt.
Canadian Apprentice Training Situation in Western Canada, by A. W. McCallum, Anthes Foundry, Ltd., Winnipeg, Canada.
Report of A.F.A. apprentice training committee, by Chairman V. J. Hydar.

2:00 p.m.—*Foundry Cost Methods*

Chairman—Sam Tour, Lucius Pitkin, Inc., New York.
Melting Costs.
Nonferrous—A. E. Grover, cost consultant, Berea, O.
Steel—W. J. Corbett, Atlas Steel Castings Co., Buffalo, N. Y.
Malleable—R. E. Belt, Malleable Founders Society, Cleveland, and C. S. Anderson, Belle City Malleable Co., Racine, Wis.
Gray Iron—P. E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, O., and W. J. Grede and R. E. Lee, Liberty Foundry Co., Wauwatosa, Wis.

2:00 p.m.—*Steel Castings*

Chairman—L. E. Everett, Key Co., East St. Louis, Ill.
A Study of Steel Molding Sands, by H. W. Dietert, E. E. Woodliff, and J. A. Schuch, Harry W. Dietert Co.
Report of Committee on Methods of Producing Steel for Castings, by Chairman H. D. Phillips, Dodge Steel Co., Philadelphia.
Report of Committee on Heat Treatment of Steel Castings, by Chairman D. C. Zuege, Sivyer Steel Casting Co., Milwaukee, Wis.

4:00 p.m.—*Cast Iron Shop Course*

Chairman—L. G. Korte, Atlas Foundry Co., Detroit.
Cupola Practice — Burnt Iron, Discussion Leader — Dr. James T. MacKenzie, American Cast Iron Pipe Co.

Evening—*Stag Party*

Wednesday, May 18

8:00 a.m.—*Sand Shop Practice Course*

Chairman—Donald Yost, Budd Wheel Co., Detroit.
Practical Problems of Gray Iron Sand Control, Discussion leader—R. E. Wilke, John Deere Tractor Co., Waterloo.

9:00 a.m.—*Apprentice Training Demonstration*

Demonstration at Cleveland Trade school.

9:00 a.m.—*Malleable Cast Iron*

Chairman—Dr. H. A. Schwartz, National Malleable & Steel Castings Co., Cleveland.
Spheroidized Pearlitic Malleable Cast Iron, by Duncan P. Forbes, Gunite Foundries Corp., Rockford, Ill.
Production of Short Cycle Malleable Iron, by W. D. McMillan, International Harvester Co., Chicago.
Pearlitic Malleable—Tocco Hardening, by W. E. Benninghoff, Ohio Crankshaft Co., Cleveland.

9:00 a.m.—*Steel Castings*

Chairman—F. A. Melmoth, Detroit Steel Casting Co.
Report of Committee on Coupon Tests, presented by Chairman J. M. Sampson, General Electric Co., Schenectady, N. Y.
Effect of Deoxidation Treatments on the Ductility of Cast Steel, by A. P. Gagnebin, International Nickel Co. Inc., Bayonne, N. J.
Steel Casting Design for the Engineer and the Foundryman, by C. W. Briggs, A. R. Donaldson, Naval Research laboratories, Anacostia, Washington, and R. A. Gezelius, Taylor-Wharton Iron & Steel Co.

9:00 a.m.—*Sand Research*

Chairman—R. F. Harrington, Hunt-Spiller Mfg. Co., Boston; vice chairman, Harold W. Johnson, Greenlee Foundry Co., Chicago.
Effects of Different Electrolytes on A. F. A. Clay Determinations, by J. F. Haseman, Cornell university.
What Happens to a Core in a Core Oven, by Jasper Willsea, The Willsea Works, Rochester, N. Y.
Sand Research Committee Report, presented by Dr. H. Ries, Cornell university, Ithaca, N. Y.
Modern Automotive Foundry Sand Practices, by A. S. Nichols, Illinois Clay Products Co., Chicago.

11:00 a.m.—*Annual Business Meeting*

Lecturer—Charles R. Hook, American Rolling Mill Co., Middletown, O.

1:00 p.m.—*Steel Division Roundtable Luncheon*

Chairman—Ralph West, West Steel Casting Co., Cleveland; vice chairman, A. H. Jameson, Malleable Iron Fittings Co., Branford, Conn.
Discussions: Designing steel castings; converter steel and cement molding process.

1:00 p.m.—*Apprentice Committee Luncheon*

4:00 p.m.—*Cast Iron Shop Practice Course*

Chairman—K. H. Priestley, Eaton-Erb Foundry Co., Vassar, Mich.
Gates and Risers for High Test and Alloyed Cast Iron, by C. C. Brisbois and A. E. Cartwright, Robert Mitchell Co. Ltd., Montreal, Canada.

4:00 p.m.—*Malleable Shop Practice Course*

Chairman—D. I. Dobson, General Malleable Corp., Waukesha, Wis.
Practical Metallurgical Problems, Discussion leader—J. H. Lansing, Malleable Founders' society, Cleveland; assistant leader, A. N. Fulton, Northern Malleable Iron Co., St. Paul, Minn.

Evening—*Annual A.F.A. Dinner*

Thursday, May 19

8:30 a.m.—*Sand Shop Practice Course*

Chairman—P. Charles Fuerst, Falk Corp., Milwaukee.
Practical Problems of Core Room Sand Control, Discussion Leader—H. L. Campbell, American Hoist & Derrick Co., St. Paul, Minn.

10:00 a.m.—*Malleable Cast Iron*

Chairman—L. N. Shannon, Stockham Pipe Fittings Co., Birmingham, Ala.; vice chairman, Leon J. Wise, Chicago Malleable Co., Chicago.
Factors Influencing Annealing Malleable Iron, by A. L. Boegehold, General Motors Research laboratory, Detroit.
Atmosphere Control in Annealing Malleable Iron, by E. G. DeCoriolis and R. J. Cowan, Surface Combustion Corp., Toledo, O.
Design of Conveyor Equipment for Malleablizing Furnaces, by H. H. Harris, General Alloys Co., Boston.

10:00 a.m.—*Materials Handling*

Chairman—E. W. Beach, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; vice chairman, Joseph Thomson, Continental Roll & Steel Foundry, East Chicago, Ind.
Foundry Maintenance, by Carter Bliss, Scullin Steel Co., St. Louis.
Conveyors in a Modern Foundry, by J. B. Silver, Palmer-Bee Co., Detroit.
Tramrail Distribution of Core Sands and Cores, by A. F. Anjeskey, Cleveland Tramrail division, Cleveland Crane & Engineering Co., Cleveland.

12:30 p.m.—*Malleable Division Rountable Luncheon*

Chairman—P. C. DeBruyne, Moline Malleable Iron Co., St. Charles, Ill.
Annealing Malleable Iron.

2:00 p.m.—*Foundry Safety and Hygiene*

Chairman—H. S. Washburn, Plainville Casting Co., Plainville, Conn.
Silicosis and the Foundry Industry, by Dr. Leonard Greenburg, executive director, division of industrial hygiene, department of labor, State of New York.
Discussion Leader—Dr. J. H. Chivers, Crane Co., Chicago.

4:00 p.m.—*Cast Iron Shop Practice Course*

Chairman—Harry Rayner, Dodge Brothers Corp., Detroit.
Cupola Operation, Discussion Leader—G. P. Phillips, International Harvester Co., Chicago.

4:00 p.m.—*Malleable Shop Practice Course*

Chairman—D. I. Dobson, General Malleable Corp., Waukesha, Wis.
Shop Practice Problems Discussion Leader—Ed Meyer, Chain Belt Co., Milwaukee, Wis.; assistant discussion leader—A. Van Lantschoot, Iowa Malleable Iron Co., Fairfield, Iowa.
Design of Straightening Equipment for Malleable Iron Castings, by C. W. Weedfall, Saginaw Malleable Iron division, General Motors Corp., Saginaw, Mich.

Modern Methods Feature Show

THE 1938 Foundry Show, to be held in Cleveland's large and well equipped exhibition hall, promises to be the best ever staged under the auspices of the American Foundrymen's association, according to C. E. Hoyt, executive vice president. While not quite as large in floor space used as the Cleveland show of 1930, from the standpoint of the educational values, new equipment on exhibition, and attractiveness of the entire presentation, the coming show will far surpass any previous exposition.

As may be noted on the opposite page, well over 200 manufacturers of foundry equipment and supplies are co-operating with the association in making the 1938 show an outstanding attraction and an unqualified success. Equipment and supplies to be displayed are of prime importance in the production of quality castings to meet present day competition. Some new equipment or recently developed refinements in equipment and supplies will be shown for the first time.

Public Auditorium and the Underground Exhibition Hall, located within walking distance of the principal downtown hotels, offer exceptionally fine facilities for staging the Foundry Show. The Exhibition hall has been completed since the previous show in 1930, and now permits the entire exhibition to be held under one roof.

A preview of the 1938 foundry exhibition will be presented from 1 to 10 p.m. on Saturday, May 14 for the benefit of operating men and executives in the northeastern Ohio territory. This feature of the program will be known as Northeastern Ohio Chapter Day and a large committee, with Ralph H. West, West Steel Castings Co., as chairman and B. F. Lambert, Diamond Alkali Co. as vice chairman, is handling the distribution of tickets throughout the territory. This will permit the foundry employes of the territory to see and study the latest achievements in machines, equipment, metals, materials and supplies. Special tickets may be procured free through the individual foundries or from members of the committee of the Northeastern Ohio chapter. The show will be closed on Sunday.

The exhibit will open at 9 a.m. on Monday, Tuesday, Wednesday, and Thursday and will close at 5:30 p.m. daily with the exception of Thursday, when the closing hour will be 10 p.m.

Exhibitors at Cleveland

(Corrected to April 20)

A

Abrasive Co.
Abrasives
Ajax Electric Furnace Corp.
Ajax Metal Co.
Albany Sand & Supply Co.
Allis-Chalmers Mfg. Co.
Alpha-Lux Co.
American Air Filter Co.
American Crucible Co.
American Foundry Equipment Co.
American Gum Products
American Metal Market
American Optical Co.
Angell Nail & Chaplet Co.
Arcade Mfg. Co.
Art in Bronze Co.
Automatic Transportation Co.
Ayers Mineral Co.

B

Baker-Perkins Co.
C. O. Bartlett & Snow Co.
Bausch & Lomb Optical Co.
Beardsley & Piper Co.
Bethlehem Steel Co.
Black & Decker Mfg. Co.
Black, Sivalls & Bryson, Inc.
Blystone Mfg. Co.
Bradley Washfountain Co.
Adolph I. Buehler

C

Campbell-Hausfeld Co.
Canada's Foundry Journal
Carborundum Co.
Carborundum Co., Refractory Div.
Edwin S. Carman, Inc.
Certified Core Oil & Mfg. Co.
Chain Belt Co.
Champion Foundry & Machine Co.
Chicago Mfg. & Distributing Co.
Clark Tructractor Co.
Clearfield Machine Co.
ClerSite Co.
Cleveland Flux Co.
Cleveland Quarries Co.
Cleveland Trade School
Climax Molybdenum Co.
Coffing Hoist Co.
L. A. Cohn & Bro., Inc.
Combined Supply & Equipment Co.
Corn Products Refining Co.

D

Daily Metal Trade
Dayton Oil Co.
Delhi Foundry Sand Co.
Delta Oil Products Co.
Wm. Demmler & Bros.
Detroit Electric Furnace Co.
Harry W. Dietert Co.
Di-Mold Corp.
Dings Magnetic Separator Co.
Joseph Dixon Crucible Co.
Dodge Mfg. Corp.
Dougherty Lumber Co.

E

Eastern Clay Products, Inc.
Economy Tool & Machine Co.
Electro Metallurgical Co.
Electro Refractories & Alloys Corp.
Elwell-Parker Electric Co.
Employers Mutuals

F

Fanner Mfg. Co.
Federal Foundry Supply Co.
Federated Metals Div., A. S. & R. Co.
THE FOUNDRY
Foundry Equipment Co.
Foxboro Co.
Freeman Supply Co.

G

Globe Steel Abrasive Co.
Great Lakes Foundry Sand Co.
Great Western Mfg. Co.
Grimes Molding Machine Sales

H

Hanna Furnace Corp.
Harnischfeger Corp.
Benj. Harris & Co.
Haskelite Mfg. Corp.
Hercules Powder Co.
Herman Pneumatic Machine Co.
Hickman, Williams & Co.
Hill & Griffith Co.
Hines Flask Co.
Hoffman Foundry Supply Co.
Hydro-Blast Corp.

I

Illinois Clay Products Co.
Illinois Testing Laboratories, Inc.
Industrial Minerals Co.
International Graphite & Electrode Corp.
International Molding Machine Co.
International Nickel Co., Inc.
Iron Age

J

Jackson & Church Co.
Jeffrey Mfg. Co.
Johnston & Jennings Co.

K

Keener Sand & Clay Co.
Kindt-Collins Co.
H. Kramer & Co.

L

Lancaster Iron Works, Inc.
Lava Crucible Co. of Pittsburgh
R. Lavin & Sons, Inc.
E. Leitz, Inc.
Linde Air Products Co.
Link-Belt Co.

M

Machine Design
Macklin Co.
Martindale Electric Co.
J. S. McCormick Co.
Metals & Alloys
Michigan Smelting & Refining Co.
Milwaukee Foundry Equipment Co.
Mine Safety Appliances Co.
Modern Equipment Co.
Monarch Engineering & Mfg. Co.
Mt. Jewett Fire Clay Co.
Mullite Refractories Co.

N

National Engineering Co.
National Smelting Co.
New Haven Vibrator Co., Inc.
Newaygo Engineering Co.
Niagara Falls Smelting & Refining Corp.
Wm. H. Nicholls Co.
Norton Co.

O

S. Obermayer Co.
Oiless Core Binder Co.
Osborn Mfg. Co.

P

Palmer-Bee Co.
Pangborn Corp.
Parsons Engineering Corp.
Peerless Mineral Products Co.
Pennsylvania Pulverizing Co.
Penola Inc.
Penton Publishing Co.
George F. Pettinos, Inc.
Pickands Mather & Co.
Pittsburgh Crushed Steel Co.
Pittsburgh Lectromelt Furnace Corp.
Pyro Clay Products Co.
Pyrometer Instrument Co.

Q

Quandt Chemical Co.

R

Ramtite Co.
Ready-Power Co.
Reeves Pulley Co.
Reliable Pattern & Castings Co.
Republic Coal & Coke Co.
Republic Steel Corp.
H. H. Robertson Co.
Robeson Process Co.
Royer Foundry & Machine Co.

S

Safety Clothing Co.
Safety Engineering
Safety Equipment Service Co.
Safety First Shoe Co.
Sand Products Corp.
Claude B. Schneible Co.
Schramm, Inc.
F. E. Schundler & Co.
Arthur Seligman & Co., Inc.
Semet-Solvay Co.
Simplicity Engineering Co.
Sims Matchplate Co.
Sloss-Sheffield Steel & Iron Co.
W. W. Sly Mfg. Co.
Werner G. Smith Co.
Smith Facing & Supply Co.
Smith Oil & Refining Co.
Smith & Richardson Mfg. Co.
South Bend Lathe Works
Spencer Turbine Co.
SPO, Inc.
Standard Conveyor Co.
Standard Safety Equipment Co.
Standard Sand & Machine Co.
Steel
Steel Shot & Grit Co.
Steelblast Abrasives Co.
Sterling Grinding Wheel Co.
Sterling Wheelbarrow Co.
Frederic B. Stevens, Inc.
Swan-Finch Oil Corp.

T

Tabor Mfg. Co.
Taggart & Co.
Tamms Silica Co.
Toledo Scale Co.
Truscon Steel Co.
W. S. Tyler Co.

U

Union Carbide Co.
United Compound Co.
United States Electrical Tool Co.
United States Graphite Co.
U. S. Hoffman Machinery Corp.

V

Vanadium Corp. of America
Vesuvius Crucible Co.

W

Wheeling Steel Corp.
White Bros. Smelting Corp.
Whitehead Brothers Co.
Whiting Corp.
Willsea Works
Wisconsin Steel Co.
Woodward Iron Co.

Z

Zanesville Sand Co.
Carl Zeiss, Inc.
Zippler Tuyere Systems

FINISHING A

ONE of the important economies to be realized by the use of aluminum alloy castings is the ease with which they can be finished. Aside from the light weight, which facilitates their handling during the finishing operation, aluminum alloy castings possess certain natural characteristics which constitute further advantages. Relative smoothness of their cast surfaces and absence of burned-in sand, the non-abrasive character of the metal, and relative ease and speed with which the metal can be trimmed and ground, all make for finishing economy.

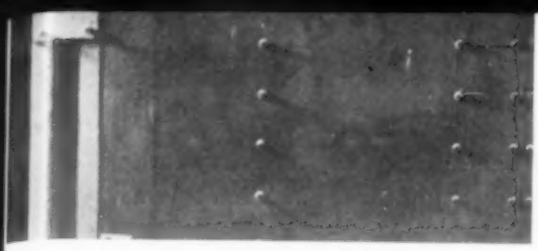
Core knock-out, chipping, sawing, grinding and polishing are normally executed with the standard tools developed for that purpose, although certain modifications in the tool operation may be required for best results with aluminum. Proper selection of tools and materials depends to some extent on size and shape of castings to be finished and nature of the finish required. Therefore, the following recommendations, while based on general practices, may require modification in certain cases to provide the most efficient finishing system for particular plant conditions and casting design.

Knock Cores Out of Castings

Removal of cores constitutes the first operation in the finishing of many castings. Normally the removal of cores from aluminum alloy castings presents few problems other than exercising sufficient care to prevent breakage of castings, particularly while they are hot. A light rapping of the casting and possibly some probing with a bar generally is sufficient to loosen the sand so it will run out of the casting cavities readily. Pneumatic rapping machines for small castings and air hammers for larger castings will facilitate this removal.

Certain core mixtures are more readily removed than others. Consideration of this characteristic in making cores for any particular job often will facilitate their removal, particularly from inaccessible pockets. Castings in which properly made cores are used,

Fig. 1 (Right) — Mechanical properties of certain aluminum alloy castings can be improved considerably by heat treatment in accurately controlled furnaces. Fig. 2 (Below, extreme left)—Bonded abrasive wheels mounted on polishing lathes are used for snagging and rough grinding of small castings. Fig. 3 (Below, left)—Satin finishing of large irregular surfaces is accomplished easily with suitable wire wheels and a portable tool. Fig. 4 (Below, center)—Gates, risers and surface irregularities that cannot be reached conveniently with a saw, are removed with pneumatic chipping hammers. Fig. 5 (Below, right)—Polishing of large castings is done with air driven portable tools equipped with rag wheels. Fig. 6 (Below, extreme right)—Buffing of small castings is done on lathes equipped with stitched muslin wheels



By H. J. ROWE

Aluminum Co. of America
Cleveland

Aluminum Castings

should likewise be free of burned-in sand, and hence offer no trouble in removing the last traces of sand from the surfaces.

Gates and risers that are readily accessible are best removed with band saws. For average work, heavy-duty wood-working saws have been found satisfactory, but for heavy work high-speed metal-working saws are preferred. Such saws are operated at speeds of 3000 to 5000 feet per minute, the speed depending upon metal section; the heavier the section the slower the blade speed. The saw blade width and gage, as well as tooth pitch, also are controlled by thickness of section to be cut. Blades up to 1½-inch in width by 16 gage, with 3 teeth per inch, are common for extremely heavy work. For light work, blades ½-inch wide by 20 gage and with up to 8 teeth per inch, are used satisfactorily.

Ordinary carbon steel in the spring tempered condition is largely used for these saws and can be resharpened readily by filing. Such saws should be provided with not more than a 5 degree top rake and about 0.030-inch clearance to minimize heating due to the teeth dragging. Use of a saw with too much top rake or hook will cause the saw to feed into the work too rapidly for hand feeding and may result in the blade pulling out of the guides. Saws such as used for cutting wood, which provide teeth with a negative rake, should not be used with aluminum. A cutting oil, stick grease, or tallow should be used as a

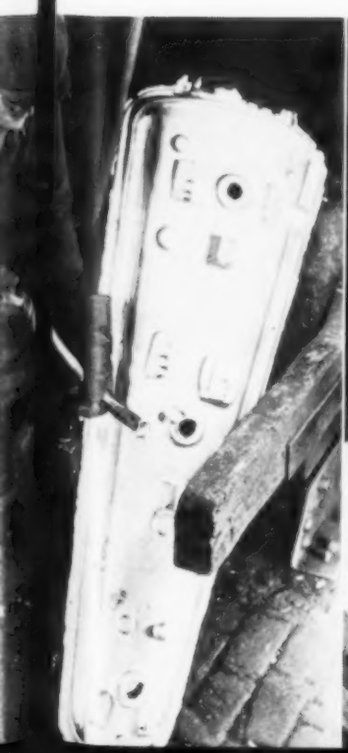


Fig. 7 (Above)—Exacting technique is required in arranging the work for x-ray exposures. Fig. 8 (Below)—Gates and risers that are accessible are removed readily with band saws

coolant and lubricant, particularly for heavy cutting.

Sprue cutters also provide a means of removing gates from accessible locations although often not as cleanly as a saw. Care must be used in keeping such cutters sharp or the metal may tear below the casting surface.

Pneumatic chipping hammers may be used to remove gates and risers that cannot be readily sawed or sheared off. To avoid breakage of metal into the casting proper, the preliminary cut with such chisels should be made a little above the surface. Excess metal then can be removed by subsequent operations. Pneumatic chipping hammers are likewise useful in removing fins and surface irregularities as well as the final traces of gates which were cut off by a saw or sprue cutter. By substituting a blunt-nosed tool in place of the chisel, an excellent tool is provided for peening other surface irregularities. A cutting or lubricating oil will be found useful with chisels.

Wheels Suitable for Grinding

The great variety of grinding wheels available for both portable and stationary tools, permits considerable flexibility in snagging and grinding operations. For small castings, bonded abrasive wheels of suitable diameters, mounted on conventional lathes, are generally satisfactory for rough grinding on external surfaces. Flexible shaft machines with small burrs or abrasive wheels readily reach the other surfaces.

For large castings air or electrically driven tools are useful for rough grinding. When considerable metal is to be removed, particularly from a flat surface, rotary vertical grinders equipped with bonded abrasive cup wheels are most satisfactory. Flexible abrasive paper disks used with such portable vertical grinders are better adapted to irregular surfaces. In other cases, wheels built up of muslin or canvas to the required thickness, and set up with abrasives glued to their circumference, are employed with portable grinders for rough grinding on irregular surfaces.

Type and size of abrasive, type of bond, and wheel speed are important considerations in the selection of polishing equipment. Aluminous abrasives from No. 20 to No. 80 are generally preferred for the rough grinding work, their characteristics providing the desired cutting efficiency. The use of solid bonded wheels with suitable synthetic resin bond and filler is also a preferred practice although various vitrified bonds are used for some applications. Selections of the proper bond is important to provide wheels with the least tendency to load with metal. Muslin or canvas wheels to which the abrasive is attached with glue, must be set up with special attention to both composition of glue and methods of application. Manufacturers of both wheels and abrasives are familiar with requirements for aluminum sand castings and are in a position to recommend the wheels best suited for any particular operation.

Since aluminum alloys are somewhat softer than many of the other metals, softer abrasives and bonding materials are required. Wheel speeds must therefore be reduced to maintain (*Please turn to page* 128)

Gray Iron Founders Hold Annual Meeting

THE annual meeting of the Gray Iron Founders' Society Inc., was held at the Hotel Statler, Buffalo, on Friday, March 25. A number of interesting talks and the annual election of directors and officers featured the meeting.

On Thursday evening, March 24, Executive Vice President, W. W. Rose, entertained a number of visiting and resident gray iron foundry executives at a dinner in honor of the past, present and nominated directors of the society.

Discuss Industrial Relations

The annual meeting of the society was called to order at 10 a.m. by Peter E. Rentschler, Hamilton Foundry & Machine Co., Hamilton, O., and president of the society. After inviting attention to the fact that the meeting constituted the tenth consecutive annual gathering of the society, Mr. Rentschler introduced J. A. Voss, director of industrial relations, Republic Steel Corp., Cleveland, who addressed the meeting on the subject of "Industrial Relations."

Mr. Voss presented an exceptional discussion and following his formal presentation was kept on his feet for nearly an hour, answering questions which displayed unusual interest. The society members present were struck particularly by the temperate common sense and good judgment exhibited in his remarks. The frank admission of the trend of the times and sane measures to co-operate with the situation toward restoration of good feeling and understanding between management and employe were evident throughout.

This was followed by a sound film on "What Employes Think" supplied through the courtesy of the National Association of Manufacturers. This proved an adequate complement to Mr. Voss' remarks by showing the results of a country-wide survey to obtain the current employe thought in manufacturing industries. Some of the results were most surprising and should be of infinite value in guiding industrial relations policies into the paths of peace.

I. J. Fairchild, chief of the trade standards division of the bureau of standards, Washington, next spoke on "Why Certify Quality of Castings." His address demonstrated by actual experience and examples what can be accomplished by the adoption of classifications in the industry and subsequent labeling and certification to the consumer. He showed outstanding examples of where such concerted action had led away from destructive price structures and raised certain industries from the depths of despondency and disintegration to the realms of reasonable profit and improved status of recognition by the consumer.

Mr. Fairchild's address was followed by a complimentary luncheon to all present. At its termination the society was addressed by Dr. Oscar E. Harder, assistant director, Battelle Memorial institute, Columbus, O. Dr. Harder spoke on "Engineering Data in Sales Service." He demonstrated the paucity of such data in the records of the industry and necessity therefore in the successful pursuit of sales based on the known advantages of cast iron. The talk came under three headings: (a) Properties of materials produced; (b) suitability of materials for different engineering applications and (c) ammunition for use in sales and other publicity.

Society Elects Directors

The afternoon session was confined to the business meeting of the society. The outstanding features were an accepted definition of the functions of the society to avoid duplication of other efforts as outlined by the Executive Vice President, W. W. Rose; a discussion as to how the society best can accomplish its objectives; a resolution to undertake a program of establishing research in engineering data to further sales in the language best understood by the engineer and designer and a resolution to elect but a third of the board of directors each year with intervals of at least 1 year in terms of office so as to distribute the interest in the society.

The following were elected to serve as directors during the ensuing year: M. D. Bingham, treasurer-general manager, Somerville Iron Foundry Co., Somerville, Mass.; A. A. Campbell, secretary, Dake Engine Co., Grand Haven, Mich.; C. R. Culling, vice president, Carondelet Foundry Co., St. Louis; A. C. Denison, president, Fulton Foundry & Machine Co., Cleveland; E. C. Graham, manager, Acme Foundry & Machine Co., Blackwell, Okla.; William J. Grede, president, Liberty Foundry Inc., Wauwatosa, (*Please turn to page* 144)

C. R. Culling
President

R. E. Kuehner
Vice President

J. H. Pohlman
Secretary

P. E. Rentschler
Retiring President

Four Decades of S

MANY interesting features in connection with the early steel foundry industry in Milwaukee, and with the men responsible for its inception, were set forth accurately and at times entertainingly by the late Charles Vickers in the Jan. 1 and Jan. 15, 1932 issues of THE FOUNDRY. Articles were based on reminiscences of a period when Mr. Vickers temporarily abandoned the nonferrous field with which he was familiar, to take what popularly is known as a gander into the mysterious jungle in which at that time producers of steel castings maintained their lairs.

Groping forward more or less blindly in a new field these heroic pioneers received little or nothing in the way of monetary reward, but they blazed a trail which greatly facilitated explorations of their successors. Experiment and failure marked the pitfalls and hazards, the many blind alleys and dead end streets which accounted for the comparatively slow progress made in the early days of the steel foundry industry.

Iron and brass foundrymen accustomed to the temperatures of their respective metals and to the molding and core sands that would stand up satisfactorily, experienced great difficulty in developing a temperature in the furnace that would render steel sufficiently fluid to flow readily. They had still more difficulty in finding refractory furnace materials to withstand these temperatures. Many materials were tried and many years elapsed before a satisfactory molding material was discovered; a material refractory enough to withstand the high temperature of the molten steel and produce clean castings instead of—to quote a contemporary customer expression of the period—lumps of conglomerate dug out of a stone quarry. Apparently then as now customers would have their little joke. Ironically enough the ideal molding material as finally discovered was nothing more or less than plain silica sand, a natural product showing virtues far in excess of any of the fearful and wonderful facing materials compounded from graphite, brick bats and old clay crucibles.

In addition to the many practical and technical details involved in the actual production of the castings, the pioneer steel men faced the usual inertia of customer response which characterized the attempted introduction of any new product. Breaking through this inertia barricade and building up a demand for steel castings taxed the enthusiasm, resourcefulness and energy of the promoters probably to a greater extent than the problem of producing the casting after the order—in modern phrase—was in the bag.

This was the situation when George H. Smith, young

indicate that George H.—as the boys say—had what it takes!

In the early years the company shipped castings all over the country. Steel foundries were few and far between and high freight rates did not constitute a factor in the problem. On more than one occasion two shipments left the plant simultaneously, one for Portland, Me., and the other for Portland, Oreg., thus spanning the continent from the Atlantic to the Pacific.

Mr. Smith was one of the original group which organized the Steel Founder's Society of America. For many years he was extremely active in every feature connected with the production and sales of steel castings. Following his death the business of the Geo. H. Smith Steel Casting Co. was carried on by his associates until early in 1937 when the assets were purchased by Edward A. Bacon and a new corporation organized under the name of the Smith Steel Foundry Co. Present executive staff includes Edward A. Bacon, President; W. J. Donnelly, treasurer; P. W. Kaukmann, secretary; Oscar F. Patzke, vice president and sales manager; and C. E. Silver, superintendent.

For the first 2 years 1898-1900, steel was melted in crucibles. This method was discarded in 1900 in favor of one of the first Tropenas or side blow converters installed in United States steel foundries. Later a second unit was added and with the cupolas was operated inside one end of the building. In blowing position

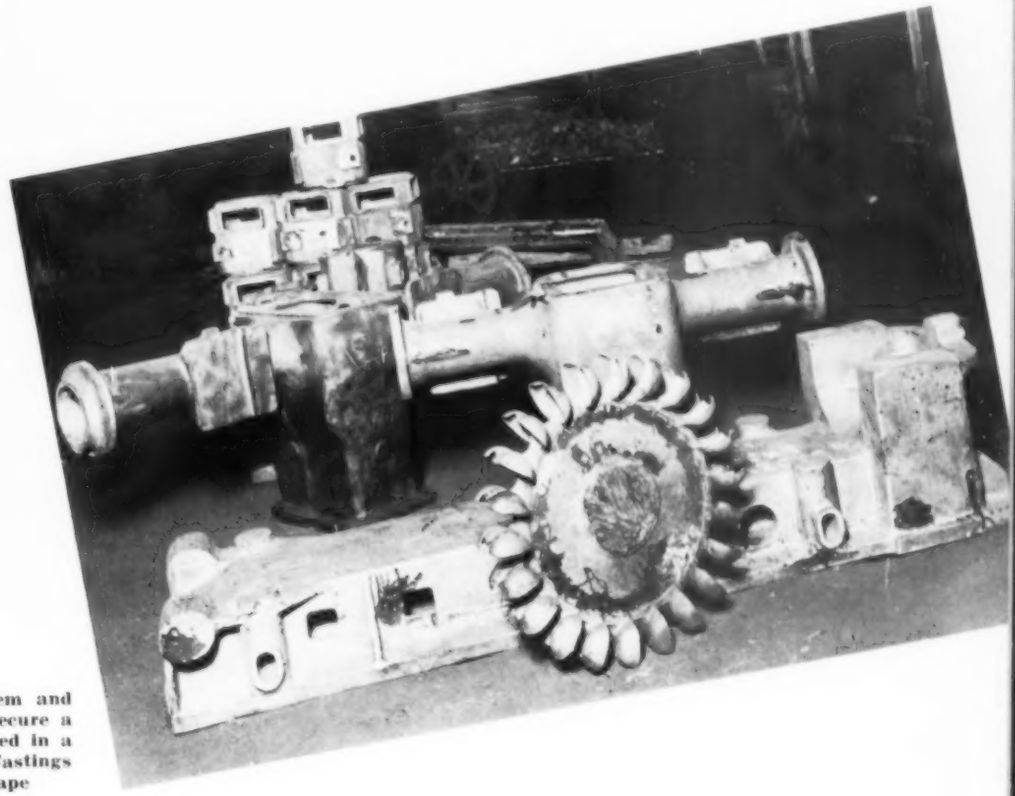
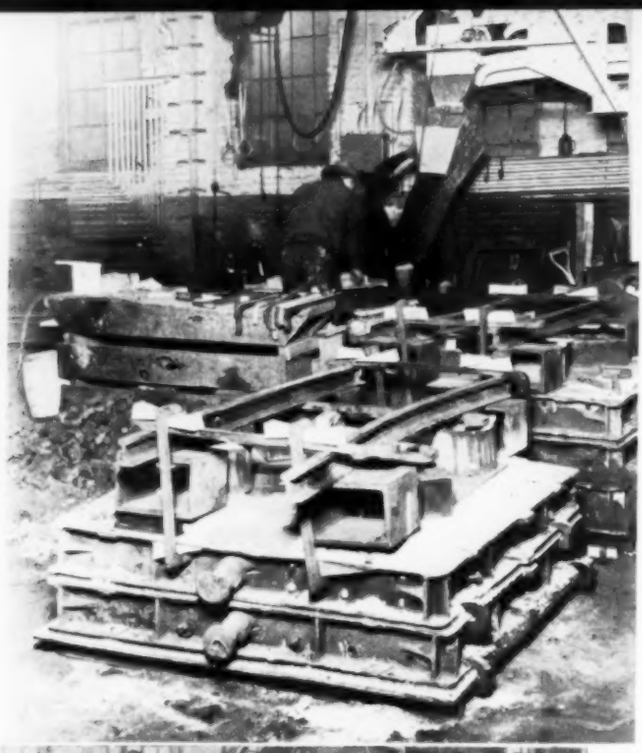


Fig. 1 (Upper Left)—Elaborate gating system and great number of feeding heads required to secure a solid casting. Fig. 2 (Center)—Metal is melted in a 3-ton electric furnace. Fig. 3 (Right)—Castings typical of wide variety in size and shape

industrialist looking around for a profitable venture, appeared on the scene in September, 1898. Short on funds, but long on imagination which foresaw a certain and steadily expanding field for the steel casting industry, he plunged to the full extent of his resources and credit. Tradition modestly refers to the first item as amounting to $500.00. Value of the second item tactfully is left to the imagination. The fact that the business he established, The Geo. H. Smith Steel Casting Co., still is functioning and has expanded steadily over a period of four decades would seem to the flame from the converter roared through an opening in the wall and it is claimed on more than one occasion set fire to horse drawn loads of hay passing by on the street. A far cry from conditions in immaculate Milwaukee today where a strictly enforced smoke ordinance hangs over every chimney top and where it is claimed special permission must be secured from the city hall before a bunch of the boys can whoop 'er up and hold a stag smoker over Joe's place.

The converters had a long and honorable career and were pushed to capacity during the turbulent war



years when every steel foundry in the country was melting more steel than the most optimistic owners, experts and ordinary patriots considered possible. These were the happy golden years when flaming steel flowed day and night. Where inexhaustible orders remained unfilled. Where cost figures were viewed with amused toleration. Where owners drew fat dividends and workmen drew fat pay checks.

Changed conditions following the war, beating the sword into a plow share and all that kind of stuff, developing new markets, introduction of alloy steels, sharply competitive prices over the reduced volume of business available and other factors including the natural desire to remain in the van, induced the company in 1921 to remove the converters and install a 3-ton electric furnace made by the Pittsburgh Lectromelt Furnace Corp., Pittsburgh. Early in the present year a 1-ton capacity furnace supplied by the same interest was installed specifically for the production of stainless steel.

Fan Removes Furnace Smoke

The large furnace is operated near the center of the main foundry building, thus reducing the distance the molten metal has to be carried in either direction. The small furnace with all auxiliary equipment is set up in an adjoining building into which formerly the metal from the larger furnace was conveyed in a ladle suspended from a monorail. Practically all the molds in this section of the foundry are small, made either in small flasks or in snap flasks, and the metal is poured either from hand ladles or from small shank ladles carried by two men. An elaborate suction fan installation over the furnace removes all smoke and gas rising from the furnace and insures a desirable atmosphere in the vicinity for the operators.

Neatness and order, a major plank in the present owner's program, is exemplified in this trim and snug unit, mounted above a newly concreted floor and with a neat and symmetrical pit in front for the accommodation of a crane ladle when the furnace is tapped. A power jib crane made by the Harnischfeger Corp., Milwaukee, is available for lifting any loads including the work involved in changing tops on the furnace. Transformers and all other electrical equipment for operating the furnace are enclosed in a brick walled room. A large panel with all the necessary dials, gages and indicators is mounted on the outside wall of this room facing the furnace. All very elaborate, shining and elegant and more reminiscent of a power house or scientific laboratory than of a casting shop. In addition to its proper and legitimate function of melting metal in a highly satisfactory manner, the electric furnace in the foundry industry should be given credit for a general face lifting program.

In this connection it is interesting to note that the executive staff holds to the belief that a dirty foundry indicates a sloppy state of (*Please turn to page* 141)

Fig. 4 (Above)—In many instances dry sand cores are clamped on top of molds to serve as copes. Fig. 5 (Center)—Cores shown at the left are mere shells to promote crushability while the metal is contracting. Fig. 6 (Below)—Dry sand mold ready for closing

Melting Nonferrous Metals

Selection of Burner or Furnace for Oil or Gas Fuel Should Be Given Careful Consideration by the Foundry

By N. K. B. PATCH

MANUFACTURERS of gas and oil fired melting furnaces have made a careful study of the design and application of these fuels to the heating of a crucible full of metal. Furnaces in use are of two fundamental designs. One is the type in which the crucible and charge are lifted out of the furnace to be transported to a point where the metal is to be poured. The other has a crucible fixed in the furnace itself and when the charge is melted, the molten metal is poured from the crucible into a previously heated ladle or crucible for transportation to the pouring floor. Conditions in the foundry will influence the decision.

Operation of either type of furnace is much the same. The crucible is placed and preheated, after which the melter places a cushion of small pieces of the desired alloy or the ingredients of the alloy in the bottom of the crucible. These small pieces melt rapidly forming a puddle to absorb the remainder of the charge and hasten melting. In charging the crucible, care should be taken that the ingots or castings are placed loosely so that as they expand upon heating they will not crowd the crucible and fracture it.

Obviously, ingot metals or castings, upon becoming molten, occupy much less space than when solid, providing room for additions to the charge if the crucible is to be filled with molten metal. Therefore, the remainder of the charge should be placed where it may be preheated to prevent unnecessary cooling of the molten metal.

Where a flue is available, the additional metal may be placed on the flue to be warmed; but where the furnace exhausts through vents into the hood, castings or ingots must be placed around this vent. However, care should be taken to see that these pieces are placed where an ample air supply is available so that underburnt gases may not be absorbed even though the metal has not yet reached the melting point. It is well known that some of the underburnt gases are absorbed by the metal at a relatively low temperature; for example, at a low red heat.

When the charge has been melted completely and brought to the pouring temperature, it should be withdrawn from the furnace at once and poured into the waiting molds. It is much better practice to have the molds wait for the metal than to have the metal wait in the furnace for the molds.

Some burners operate with low oil or gas pressure and air pressures from 3 to 25 ounces and in some cases even higher. Others operate with higher oil or gas pressure and the air supply is changed correspondingly to meet the requirements. In deciding upon the burner to be used, it is well to study carefully the conditions produced by the burner.

Perfect combustion, of course, is the first requisite. A quiet, steady source of heat is to be preferred over a surging rushing source of heat energy. Too rapid a flow of the burning gases through the furnace must mean that these gases have passed through the furnace before they have had an opportunity to deliver much of their heat energy to melting.

Gases Circulate Freely

To direct the burning flame against a local spot on the crucible or furnace necessarily must result in excessive erosion at that point and consequent serious damage to the crucible if that is the affected point. Therefore, free circulation of the burning gases around the crucible is to be desired.

Likewise, care should be taken to see that the effect of these burning gases is not excessively detrimental to the furnace lining, since the upkeep of the furnace is just as much of a charge against melting as fuel cost. In some localities natural gas is available, in which case the B.t.u. is high and the cost is low. In other localities the gas that is available is too expensive and fuel oil is preferred.

A different type of burner will be found desirable for these different types of fuel, of course. Since different types of fuel oils are available in different localities, again a different type of burner may be found necessary for each of the different types of fuel oil.

(*Please turn to page* 138)

Cupola Fallacies Are Ventilated

THE old story we have heard so often is that no two cupolas are alike. We have heard it so often, we agree it must be true. Now we are to be disturbed by one who says they are alike and will perform equally well if all conditions of operation are the same. Operating conditions may vary over wide ranges from foundry to foundry, but within one foundry this is not necessarily true. For example in one foundry, two 60-inch inside diameter cupolas were operated on alternate days, with the same fuel, same charging gang, same cupola tender, same blower, same volume meter and yet one melted 28,000 pounds of iron per hour consistently while the other melted only 22,000 pounds. Our contention that cupolas are alike seemed shot full of holes, until we found the branch piping between the air meter and the slow melting cupola was shot full of holes and we plugged the air leaks. After that both cupolas melted alike at 28,000 pounds per hour. Many foundrymen have replaced an old cupola with a new one of the same size. The new one worked either better or worse than the old one, but never just exactly the same. However, a thorough investigation always discloses that all operating conditions were not the same. The usual reason for unlike operation is in the amount of air received by the cupola.

Should Discard Term "Melting Rate"

A lot of mystery is removed from cupola operation by discarding the term melting rate for the more definite one, fuel burning rate. We would not put a boiler in our plant or a furnace in our home until we were sure the hearth area was sufficient to consume efficiently enough fuel to generate sufficient steam or heat for our plant or home. That is as simple as ABC and we do not have to stretch our imaginations to realize that the fuel burning rate of a cupola is proportional to the area of the cupola. Table I shows the normal fuel burning rate, in pounds of coke per hour, for nine cupola diameters.

Air measuring or air weighing devices usually are installed at some distance from the cupola. Unless the blast pipe and cupola windbox connections are free of leakage the figures shown in Table II may not have much relationship to the actual amount of air reaching the cupola. It is not unusual to have an air leakage of 20 per cent or more of the air delivered by the blower. Where leakage exists the most desirable thing to do is to eliminate the loss of air by repairing the points at which the loss occurs.

Table II shows the normal air requirements at 14.7 pounds pressure and at 60 degrees Fahr., for normal cupola operation. Frequently cupolas are operated successfully either above or below their normal operating conditions. A cupola pressure gage offers a reliable guide on the actual conditions as they exist for any particular cupola. A cupola receiving normal air supply will show a pressure of about 16 ounces. Operating with only half the normal air supply the pressure will only be 4 ounces. When operating with 50 per cent more than the normal air supply the pressure will be

By DON J. REESE
International Nickel Co.,
Bayonne, N. J.

about 36 ounces. Table III shows the relationship between cupola pressure and percentage of normal air supply.

There are reasons why the normal air requirement of a cupola will be reflected in a 16-ounce pressure on the windbox when the cupola is actually getting this normal supply and that a lower pressure indicates less than normal air and a high pressure more than normal air, but a discussion on the causes might be confusing at this time and therefore is omitted.

Melting rate of a cupola may be reduced to a simple formula:

$$\text{Melting rate} = \frac{\text{Fuel burning rate} \times \text{Fuel ratio} \times \frac{1}{4}\sqrt{P}}{2000}$$

The fuel burning rate is given in Table I. The fuel ratio is the number of pounds of iron melted with 1 pound of coke (without correcting for the coke used on coke bed) and P is the cupola pressure in ounces as shown in Table IV. On a 48-inch diameter cupola, with a 10 to 1 fuel ratio and a cupola pressure of 16 ounces, the formula would be:

$$\text{Melting rate} = \frac{1800 \times 10 \times \frac{1}{4}\sqrt{16}}{2000} = 9 \text{ tons per hr.}$$

With the fuel ratio 8 to 1 and the blast pressure 9 ounces, the melting rate would be:

$$\text{Melting rate} = \frac{1800 \times 8 \times \frac{1}{4}\sqrt{9}}{2000} = 5.4 \text{ tons per hr.}$$

On a cupola lined to 72 inches, fuel ratio 9 to 1 and the cupola pressure 36 ounces, the melting rate would be:

$$\text{Melting rate} = \frac{4000 \times 9 \times \frac{1}{4}\sqrt{36}}{2000} = 27 \text{ tons per hr.}$$

Table IV shows the value of (*Please turn to page* 146)

Table I

Burning Rate for Nine Cupolas

Cupola Diameter	24	30	36	42	48	54	60	66	72
Burning rate Pounds per hour	450	700	1000	1400	1800	2300	2800	3400	4000

Table II

Air Requirements for Cupolas

Cupola Diameter inches	24	30	36	42	48	54	60	66	72
Cubic Feet Air	1000	1570	2270	3040	4025	5100	6300	7610	8930
Pounds Air.	78	123	177	237	314	398	492	593	696

Table III

Pressure and Air Relationship

Pressure in Ounces:	4	8	12	16	20	24	28	32	36
Per Cent of Normal Air:	50	70.6	86.5	100	111.8	122.5	132	141.5	150

Table IV

$\sqrt{P}$ Value for Blast Pressures

P:√P	P:√P	P:√P
2:1.41	12:3.46	32:5.66
3:1.73	14:3.74	36:6.0
4:2.0	16:4.0	40:6.32
5:2.24	18:4.24	44:6.63
6:2.45	20:4.47	48:6.92
7:2.64	22:4.68	52:7.21
8:2.83	24:4.90	60:7.75
9:3.0	26:5.10	.....
10:3.16	28:5.28	.....
.....	30:5.47	.....

Table V

Bed Height and Blast Pressure

Pressure in Ounces:	4	8	12	16	20	24	28	32	36
Minimum Bed In Inches:	21	30	36	42	47	52	56	60	63
Recommended Bed:	27	36	42	48	53	58	62	66	69

QUESTIONS and ANSWERS

Sand Matches May Be Made From A Variety of Materials

We shall appreciate your opinion on the best mixture for a sand match that will stand the wear and tear on production work.

Care in making, finishing and reinforcing a sand match generally is more important than the material of which it is made. Practically any kind of sand may be employed from new molding sand, to the dust from under the tumbling barrels or sandblast. The latter usually is employed since it is practically a fine silica dust, takes a good impression, and becomes quite hard. The dried sand is mixed with sufficient linseed oil to the consistency of ordinary molding sand. For the ordinary size match a handful of litharge is added to the mixture.

The sand is rammed hard particularly in corners, edges and pockets. Locks of wood, nails, screws or other suitable pieces of stiff reinforcement are bedded in the sand at strategic points to increase wearability. Your attention is directed to the fact that fire clay match boards are preferred by some foundrymen. A detailed description of their manufacture and use appeared in the June 1933 issue of THE FOUNDRY. Also it may be pertinent to point out that other materials are on the market which yield more satisfactory results than sand matches, particularly where the service is severe as in production work.

Desires to Increase Life of Grates and Firepots

Can you tell us what additions can be made to regular stoveplate and heater iron to justify a 20 year guarantee on grates and fire pots?

Since ordinary stove plate iron usually is rather high in silicon content due to the fact that it is used for comparatively light work, we believe that a change in composition will be required to obtain the best possible results from the addition of an alloying agent to improve heat resisting properties. A composition recommended for grate bars, furnace pots, etc. contains 1.75 to 2.25 per cent silicon; 0.50 to 0.80 per cent manganese; 0.40 per cent maximum phosphorus; and 0.85 to 1.25 per cent chromium.

While use of that particular composition containing an appreciable quantity of chromium will increase the life of the castings under elevated temperature conditions to a considerable degree, the actual extent of that life is rather difficult to ascertain without numerous service tests.

However, it is claimed that such an iron will give from two to five times the length of service of the ordinary type of iron employed for that purpose. Consequently, if you have information on the actual service life of your present composition, you could at least expect twice the service with the new, alloy mixture.

Poor Melting Practice May Be Cause of Porous Work

We are having difficulty with porous castings in our bronze tablets and signs and would be pleased to have you send us any information which you may have pertaining to porosity in brass or bronze especially in tablets and name plates.

You do not state in what alloy you are casting your bronze tablets and name plates, nor do you state what your method is in melting or the type of equipment used. Therefore, we can only make general statements that may or may not apply to your practice. You may have noticed in the columns of THE FOUNDRY that repeated emphasis has been placed on the fact that gassed metals produce porous castings and that gassing of metal occurs during the melting process. Gassed metals are caused by the presence of underburnt gases in excessive quantities in the furnace atmosphere, which, contacting with the metal during melting, are absorbed by it. When the metal solidifies in the casting, these gases are thrown out of solution, producing the porosity described.

The cure for this is care in the process of melting to insure the minimum amount of underburnt gases, and to subject the metal to the furnace atmosphere the shortest possible period. These underburnt gases can be burnt completely if there is a sufficient amount of oxygen available to complete their combustion. Therefore, an ample supply of oxygen should be made available for the correction of such conditions as now prevent complete combustion of all gases.

Other causes for porous castings are, of course, excessive moisture in the molding sand; or too much bond in the cores, if cores are used; lack of permeability in sand or cores; hard ramming of molds, and bad gating practice.

Radiator Casting Leaks When Given Pressure Test

We are sending part of a radiator head. In the finished unit two of these headers are connected by a number of copper tubes. The castings vary from 12 to 32 inches in length and are molded on the bench. Vent from the main core is taken through one opening, 1¼-inch diameter on the cope side at one end. This main core, a plain rectangular body of sand, rests on 17 small cores in the drag. The small cores are placed in suitable receptacles in the drag face of the pattern and remain in the sand after the mold has been made and the pattern drawn. Each of the small cores forms an opening through a connection or nipple, cast integral with the remainder of the casting. Later these connections or nipples are machined inside and outside and threaded for reception of the ends of the copper tubes. The nipples are ⅝-inch high and are arranged on the face of the casting in staggered formation on 2-inch centers. After the castings are machined and water tested we find that they leak. We shall appreciate your opinion on the probable cause.

Each of these castings has a number of nipples on the drag side, separated by narrow bodies of green sand. When the nipples are filled with molten metal, these mounds of sand are surrounded by metal on the sides as well as on top. The amount of steam generated is greater than usual, while possible passages for the escape of steam are a great deal less than would be presented, for example under a flat plate or other plain surface. The result is that some of the steam is forced into the mold cavity and trapped by the metal which forms a solid shell or skin almost immediately after it comes into contact with the wall of the mold.

One remedy for the trouble would be to use a much higher permeability sand on the drag. Another is to continue with your present sand, vent the drag with a wire, and provide free access for the steam between the bottom board and the lower edges of the drag. Have the patternmaker fit up a plain board with a number of criss-cross half round or triangular strips fastened to the face in position to correspond to the sand spaces between the nipples on the pattern. This board can be used to form vent passages on the bottom of the drag before the bottom board is attached.

Small Aluminum Castings Show Defective Area in Center

We are forwarding one half of an aluminum burner for a gas stove which has a defective area in the center. The castings are poured six at a time in an iron mold. We propose to use larger gates on the theory that they will feed the casting and thus eliminate the draw in the center.

Without knowledge of all the features involved, we hesitate to offer any comment on the top part of the burner. For example you mention pouring six in a cast iron mold, but the part of the casting forwarded for examination does not show the position or size of the gate. Offhand we are inclined to agree with your diagnosis and the proposed remedy, viz.: a larger gate and sprue to feed the casting. However, if there is no imperative reason for producing the casting as a solid block, why not redesign it and thus eliminate the tendency to draw? On the other hand if you have no choice, but must produce the casting in the present chunky condition, what difference does it make whether a defective spot appears in the center or not?

If the casting has to be drilled through the center, then a steel core in the mold could form the hole and incidentally serve as a chill to promote soundness in the immediate vicinity. In the fourth place, it may be that a small independent internal chill placed in the mold is all that is required to solve your present problem. Naturally the foregoing comment merely represents long distance guessing and might have no application if one was in possession of all the facts in the case. In this connection we direct your attention to a recent book *Gates and Risers for Castings,* by Pat Dwyer, which may be purchased from the book department of THE FOUNDRY. The chapter on permanent molds for aluminum castings covers the subject in a comprehensive manner.

Wants to Increase the Tensile Strength of the Iron

We are using a mixture of miscellaneous machine iron, auto blocks, and agricultural scrap; 20 per cent stoveplate, and 25 per cent pig iron containing 2.95 per cent silicon, 0.46 per cent phosphorus, and 0.90 per cent manganese. The iron shows 20,000 to 22,000 pounds per square inch tensile strength, good grain, good machining properties, and is generally satisfactory. However, we wish to increase the tensile strength to 30,000 pounds per square inch minimum. Can you tell us what addition of steel scrap will accomplish that result, and if we can use steel alone. We have automobile steel frames, springs, crankshafts, mild steel scrap, railroad rails and spikes. Would you expect the steel to melt in the charge it was placed or would most of it come down in the succeeding charge? Our cupola is lined to 42 inches, and we melt 12,000 pounds.

Increasing the tensile strength of your iron can be accomplished by substituting 10 to 15 per cent steel scrap for some of the miscellaneous cast iron scrap now employed. Since your present mixture gives good results except for the strength, it is suggested that you proceed carefully in changing the mixture. We do not believe that substitution of 10 or 15 per cent steel scrap will cause trouble with machining unless the steel used contains considerable alloys. For example, it is not advisable to employ all springs and crankshafts for the steel addition, but a small quantity of each will serve. Scrap rails and mild steel if fairly heavy, should give good results.

In charging, the steel should be placed on the charge last, and the pig iron first. That provides a molten bath with sufficient silicon and manganese to deoxidize the steel which comes down last. If all charges contain steel scrap, you should not have any difficulty in obtaining iron of uniform composition, provided the well or reservoir of the cupola holds about one charge of metal in the molten state. If that is not the case, it is advisable to employ a mixing ladle at the spout which holds one charge of metal. However, if you intend to melt only a charge or two with steel scrap, the best practice is to run them at the end.

Long Core Sags in Center of Mold

We are forwarding a cast iron tube 1-inch inside diameter, 1⅜-inch outside diameter and 15 inches in length. These castings are molded four on a plate and poured two at a time from a runner in the cope and four small branch gates leading to each mold in the drag. Each core is reinforced with four No. 12 gage wires. We placed a chaplet on top in the center to prevent any spring in the core, but to our astonishment the cores cut through on the bottom.

The cause of the trouble is that between the time the cores are placed in the mold and the time the molds are poured, the cores lose strength and sag by their own weight. In a larger mold the molten metal would lift the core and cause it to cut through the top. In these thin castings the metal freezes on the bottom before the mold is filled and therefore cannot exert any pressure on the core. To convince yourself, open a mold that has been closed for 4 hours or more and you will find the cores sagged in the center.

The remedy is obvious. Either chaplet the core in the center, top and bottom, or reinforce it with a stiff rod. If the core is made in halves and pasted, a ¼-inch rod in each half will be sufficient. If the core is made in a hinged box and booked, a ½-inch rod may be used.

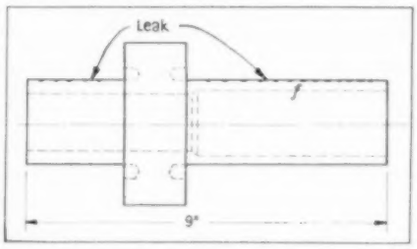
Bronze Piston Leak Is Investigated

The accompanying sketch shows a small phosphor bronze piston 2 inches diameter, 9 inches in length, of the following composition: Copper 80 per cent, tin 10 per cent, and lead 10 per cent. The casting leaks as shown in the sketch when submitted to an oil pressure of 80 to 90 pounds.

Leakage may be caused by any one or a combination of several factors. If you had forwarded a casting for examination, the appearance of the defective area probably would have supplied a definite clue. As it is, we direct your attention to several potential causes. By a process of elimination and study, you readily may determine which one or which combination is responsible for the leaky structure.

In each instance we assume that the defective area appears in that part of the casting which occupied the highest point in the cope. 1—The metal may be responsible. In any leaded mixture, the lead shows a tendency to migrate toward the bottom as the metal solidifies. Therefore, it is advisable to stir the metal vigorously with a rod before pouring it into the molds, and to pour it at a temperature that will permit it to set as quickly as possible in the mold. Naturally that temperature will vary on heavy and light castings. 2—A core that is too hard, not sufficiently dried, or not properly vented will cause the metal in contact with it to bubble more or less violently.

Violent bubbling is indicated by the number and size of the blow-



Leaky area on this casting may be due to metal, to insufficiently vented core, or to a shallow cope

holes in the casting. Minimum ebullition will not produce blowholes visible to the naked eye, but it will cause segregation or porosity in the casting. 3—Shallow copes are responsible in many instances for the type of defect shown in the sketch. As the casting sets it draws metal from the top to the bottom. Not in sufficient amount to produce an actual cavity on the high side, but — in this instance — some of the more liquid lead is drawn toward the bottom, leaving the spongy area on the top. Obviously the remedy is to provide a high sprue, generous size runner and adequate gates to not only fill the mold, but to hold the metal up until it sets.

Will Densify Metal In Its Vicinity

Can you give us information on cores which have a higher heat conducting capacity than the ordinary core? That is to say a higher heat absorbing capacity for the purpose of densifying the iron surrounding the core, without chilling it to the extent of an ordinary chill.

Iron borings from the machine shop, or metal abrasive employed for pressure blasting castings, sometimes is incorporated in the core sand for the purpose outlined. The same practice occasionally is followed in the preparation of facing sand for the teeth on gear wheel molds. An article in the Aug. 15, 1922 issue of THE FOUNDRY described a method practiced in a prominent automobile foundry for securing denser metal in the cylinder barrels. Thin, sectional plates were placed in the corebox which then was filled with the core mixture and rammed in the usual manner.

The plates formed the outside of the core and in service densified the metal in the vicinity. According to the claims and statistics set forth in the article, the method was highly satisfactory. However, for reasons with which we are not familiar the method eventually was abandoned. Possibly because increased metallurgical knowledge rendered the use of surface plates unnecessary. In the May, 1935 issue of THE FOUNDRY, J. H. Eastham refers to the use of a section of steel pipe filled with sand as a center core in a fly wheel to increase the density of the metal in the bore.

In this connection it is interesting to note that the composition of the iron and the thickness of the chill must be taken into consideration in all instances of this kind. For example, a heavy chiller that will impart a deep chill to a comparatively thin casting, will not impart any chill to a thick heavy casting of a fairly high silicon content. Metal inserts frequently are placed in cores with the object of densifying the metal in the vicinity, but proper discretion must be observed in the thickness or bulk of the chiller, and the composition of the iron to secure satisfactory results.

Defects Are Caused By Gas From Core

We are forwarding three gray iron chopper body castings with the heavy nozzles sawed through to expose shrinkage cavities. Many of the castings show this form of defect and we shall appreciate your opinion on the cause and the proper remedy.

Cavities in the two smaller castings are plain blowholes. In the third casting the initial cause of the cavity also is gas. In this instance the amount of gas was sufficient to prevent the metal from closing in naturally until it was too cold and, as a result, the cavity is due partly to shrinkage. The probable cause of all the trouble is lack of vent in that section of the core where the two main parts are joined and from which the small nozzle section projects.

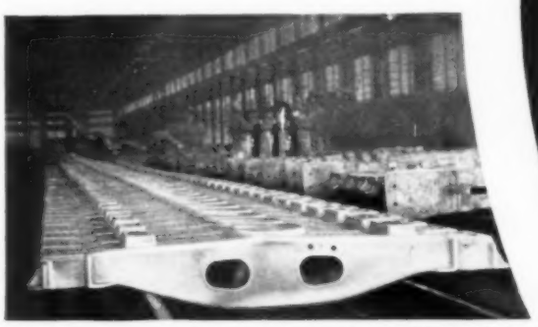
If the two halves of the core are pasted, an over dose of paste in the small nozzle core will cause the metal to kick in the vicinity. The paste should be held to a minimum and a clear vent should extend through the small nozzle core. Also a passage should be provided in the end of the mold sand print for the gas to escape.

Briefly, an excess amount of gas is generated in one particular section of the core and means must be provided for that gas to escape easily and rapidly. Apparently the

(*Concluded on page* 78)

Chase those DEADHEAD TONS *with* CAST NICKEL STEELS

You chase free riders from your freights but are you stopping the most *flagrant* operating loss — the wasted cost of hauling millions of tons of useless deadweight in old type equipment? You can stop that needless loss by using modern Nickel cast steels for important rolling stock castings.



(Above) A group of truck bolsters made of Nickel cast steel. Union Pacific officials, ordering new freight cars, saved 20-25% under casting weights by specifying Nickel cast steels in truck bolsters made by Buckeye Steel Castings Company.

BUCKEYE COMPOSITION (Average)

Carbon	0.28 %
Manganese	1.50 %
Nickel	1.40 %
Silicon	0.35 %
Phosphorus	0.030% max.
Sulphur	0.025% max.

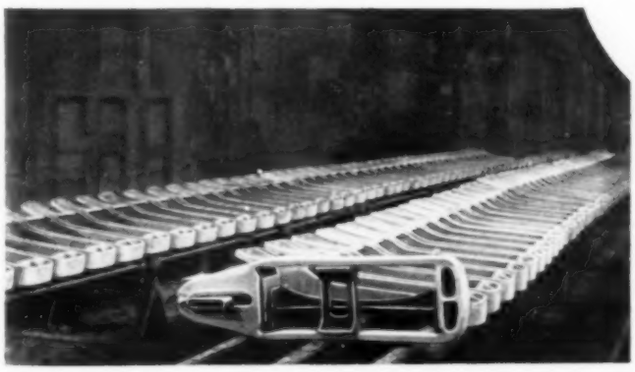
PHYSICAL PROPERTIES

	Minimum Requirements	*Typical (1) Results*
Ultimate Tensile Strength	90,000 lbs./sq. in.	95,100 lbs./sq. in.
Yield Point	60,000 lbs./sq. in.	63,840 lbs./sq. in.
Elongation in 2"	22%	26.6%
Reduction of Area	45%	57.9%

STATIC TEST RESULTS

Bolsters:	Minimum allowable breaking load	423,500 lbs.
	Actual breaking load	509,200 lbs.
Yokes:	Minimum allowable breaking load	550,000 lbs.
	Actual breaking load	655,300 lbs.

(1) Heat Treatment: Normalize at 1600° F., air cooled and subsequent tempering at 1100° F. Typical results taken on test bars attached to castings.



(Left) 5,200 light weight cast steel draft yokes were recently completed for the Union Pacific by Buckeye Steel Castings Company. This Columbus, Ohio, railroad foundry pioneered development of high-strength Nickel alloy cast steels. Nickel adds toughness, assures uniformity.

THE INTERNATIONAL NICKEL COMPANY, INC., NEW YORK, N.Y.

(*Concluded from page* 76)
core sand mixture is satisfactory. Otherwise blowholes would appear elsewhere in the casting. A large vent passage through the barrel core with a smaller passage through the nozzle section should relieve you of any further trouble.

Ferrochrome Added To Metal Charge

We have a request for certain gray iron castings to contain 20 per cent chromium and 10 per cent nickel. We have made castings containing from 3 to 10 per cent of these alloys by additions at the cupola spout. We are doubtful if that method will be satisfactory with the high amount noted.

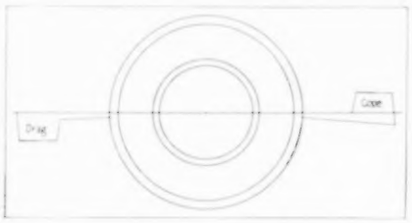
To secure a 20 per cent chromium content in the iron means the addition of approximately 30 per cent ferrochrome to the charge. This is a large amount and cannot be added at the spout because the metal in the spout and in the ladle would not absorb it due to temperature drop. The alloy can be made easily in the electric furnace. In the cupola, the ferrochrome can be incorporated in the form of briquets.

Leaks in Manifolds Caused by Runner

We are having trouble with leakage in a water cooled exhaust manifold casting approximately 5 feet in length and 7 inches outside diameter. Leaks appear only on the outside of the jacket in the vicinity of the parting line. The castings are poured from our regular iron showing silicon 2.00 per cent, manganese 0.50 to 0.75 per cent, sulphur under 0.10 per cent. Would you suggest the addition of an alloy to improve this mixture? Do you know of any solution that could be poured into the castings to stop the leaks? The castings are clean and solid when machined with the exception of the porous areas which appear only when the castings are subjected to a pressure of 75 pounds per square inch.

Since the manifold castings machine clean and solid, it is apparent that your trouble is not traceable to metal, sand, chaplets or cores, the four most usual causes of leakage. You do not supply information on the gating system, but we are inclined to the opinion that it is responsible for the leaky castings. You probably have a long runner in the drag face of the mold, parallel to the mold cavity and connected to it by a number of small, flat gates. When the metal starts to solidify, this heavy runner becomes a sucker instead of a feeder.

It may not draw enough metal to show cavities visible to the naked eye, but it draws enough to form porous areas at the places where the gate joins the casting. The obvious remedy is to provide a runner that will feed toward the casting instead of away from it. The contrast is shown in the accompanying sketch where the runner on the left is as it is at present. The correct type is shown at the right, with the runner in the cope



Faulty runner on left draws metal from the casting. Runner at right is in the cope and acts as a feeder

half of the mold and the gates in the drag. Salammoniac pumped into a casting under pressure sometimes is employed to cure porosity. This material enters the pores and seals them. A synthetic resin compound for the same purpose also may be purchased. In some instances sodium silicate (water glass) is employed. However, in this instance the proper course is to adopt a foundry technique that will produce perfect castings.

Wants Information On Bronze Tablet

We would like to have some information on the production of bronze tablets. What alloy is used most commonly? What is the process for producing the dark oxidized finish? What is done to the surface to cause it to retain the same untarnished finish for so long a time? Is it possible to give this pleasing finish to aluminum bronze?

So far as we know, there is no standard alloy for bronze tablets and grave markers. Each manufacturer seems to have some pet alloy which he believes to be little better than anything else available. A common alloy is the regular 95 per cent copper, 5 per cent tin, 5 per cent zinc and 5 per cent lead alloy, and others used are variations.

The oxidized finish you mention as employed on copper-base alloys usually is produced by dipping in a solution of sodium sulphide or ammonium polysulphide. It can be made by dissolving one part of the sulphide in 10 parts of water. If the color obained is too dark, add more water, and vice versa. To make the finish last for a reasonable length of time, some type of transparent or colorless lacquer is employed as the final coating.

To supply the oxidized surface upon aluminum bronze is more difficult and is not commonly used. There are a large number of grave markers cast in aluminum bronze, but they are preserved carefully from harm during the process of manufacture, and are used as produced from the mold. Consequently, the aluminum oxide film automatically formed on the surface of all aluminum bronze is preserved and gives a peculiar finish of its own.

There are a large number of red brass tablets cast in such alloys as 85-5-5-5 which receive no finish at all except to be plunged into cold water while they are still hot enough to be just above a black heat, that is slightly red. After that treatment the surface lettering is milled so as to produce the bright finished brass surface to contrast with the as cast background. Such tablets are more commonly used indoors where weather conditions are not so destructive of appearance.

Sizes of Pop Gates May Vary

Can you give us diameter and number of pop gates for various size castings?

The basic idea in the use of pop gates, and to a certain extent in the use of any type gate, is to conduct a maximum volume of metal into the mold in a minimum period of time. Also to introduce the metal in a great number of small streams, to minimize the erosion effect, rather than in one or two large streams. Castings vary so widely in shape and size in comparison to weight, that no hard and fast rule can be laid down.

For example on a thin wall pipe type of casting, where the streams of metal impinge on the walls and where the mold must be filled rapidly to prevent cold shuts, metal must enter through a certain number of thin narrow gates. On a casting of equal weight, but so thick in cross section that the falling streams do not touch the side walls, the gates may be larger in size and less in number. Here again other factors must be considered.

On a casting of this type the mold may be filled comparatively slowly to promote solidification from the bottom to the top. Thus for castings of equal weight, but varying in metal thickness the shape, size and number of gates may vary to a considerable extent. It would be idle to attempt to lay down a formula for size and number of gates based either on the weight or the area of the casting. There are too many other variables.

CRITICAL buyers... the foundries in and around the motor capital! Speed, precision, economy... these are the by-words. That is why Detroit's swing to Penolyn is so significant. In Penolyn, the motor makers have found a uniformity that adds greater speed to production.

Over 80% of the motor car makers in the Detroit area have adopted Penolyn not alone because of such usual claims as better workability, greater binding strength and minimum gas. Experience has shown that Penolyn has *all* the good qualities of a perfect core oil *all* the time.

For faster cleanout, fewer rejects, real foundry economy . . . use Penolyn, first choice of critical buyers.

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NEW YORK • CHICAGO • DETROIT • ST. LOUIS

David O. Thomas

James H. Smith

W. H. Doerfner

French E. Bassett

MEN of INDUSTRY

DAVID O. THOMAS, general manager, Saginaw Malleable Iron division, General Motors Corp., Saginaw, Mich., has relinquished his duties to become vice president of the Bendix Aviation Corp., South Bend, Ind., a General Motors Corp. affiliate. He has been in charge of the Saginaw division since 1930, and his service with General Motors dates back to 1912.

W. H. DOERFNER, works manager, Saginaw Malleable Iron division succeeds Mr. Thomas as general manager. He joined the Saginaw Malleable Iron Co. in 1918 as timekeeper and except for the period from 1924 to 1928 when he was constructing a foundry for the Harrison Radiator division in Lockport, N. Y., he has continued with the same division. After extensive experience in the shops he was made general superintendent, and in 1928 became works manager.

JAMES H. SMITH formerly production manager, succeeds Mr. Doerfner as works manager. FRENCH E. BASSETT, member of the sales department, has been appointed sales manager of the Saginaw Malleable Iron division.

EDWIN R. PALMER, assistant comptroller of General Motors, has been elected a vice president of Bendix Aviation Corp. He has been with General Motors Corp. since 1919, joining the Chevrolet division in Flint as an accountant. Later, he became resident comptroller and in 1929, was named treasurer of Adam Opel AG, the automotive operations of General Motors in Germany. He became general manager of that company in July, 1936, and last July was transferred to Detroit as assistant comptroller.

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C. C. CARLTON, secretary, Motor Wheel Corp., Lansing, Mich., has been elected vice president and secretary of the company.

◆ ◆ ◆

W. R. SPILLER, formerly chief engineer, White Motor Co., Cleveland, now is engaged in consulting work for the Erie Malleable Iron Co., Erie, Pa.

◆ ◆ ◆

H. C. HOOVER, formerly works manager, Ohio Steel Foundry Co., Lima, O., has been made works manager, Crawford Steel Foundry Co., Bucyrus, O.

◆ ◆ ◆

CHARLES E. EVANS has been appointed Canadian representative for George F. Pettinos Inc., Philadelphia. Mr. Evans will be located in Hamilton, Ontario.

◆ ◆ ◆

GEORGE A. FIFIELD, Sparta, Mich., purchasing agent for the Muskegon Piston Ring Co., Muskegon, Mich., recently was elected secretary and a director of that company, succeeding MRS. LOU A. KELLER who resigned.

◆ ◆ ◆

EMERSON FRANTZ, manager of the bearing division, Bohn Aluminum & Brass Co., Detroit, has been made general sales manager for that company. Mr. Frantz has been with the company since its formation in 1924.

◆ ◆ ◆

J. H. DRISCOLL, 34 Lewis wharf, Boston, has been appointed representative of the Stearns Magnetic Mfg. Co.

◆ ◆ ◆

MAX W. BABB, president, Allis-Chalmers Mfg. Co., Milwaukee, recently has been elected a director of Cutler-Hammer Inc., Milwaukee, to succeed T. Johnson Ward of Philadelphia who has retired.

◆ ◆ ◆

DR. H. W. GILLETT, chief technical advisor, Battelle Memorial institute, Columbus, O., has been chosen to deliver the 1939 Howe Memorial lecture of the American Institute of Mining and Metallurgical Engineers.

◆ ◆ ◆

C. H. POMEROY, secretary and treasurer, National Malleable & Steel Castings Co., Cleveland, has been elected a director of the company to suceed the late C. W. Hotchkiss. All other officers and directors were re-elected.

◆ ◆ ◆

J. R. WARK, Queen City Sand & Supply Co., Buffalo, recently won the grand aggregate match of the Niagara Frontier small bore rifle tournament in Buffalo. Mr. Wark

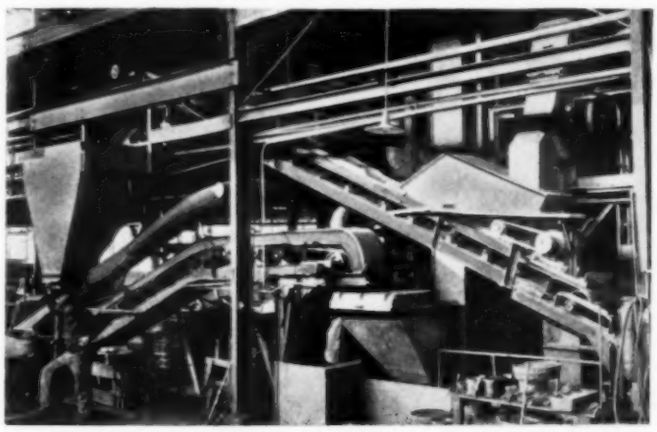
(*Continued on page* 84)

EASTERN FOUNDRY CONVEYORS • AERATORS • ELEVATORS • SAND BINS

Eastern Corporation Patented Roller Conveyor handling squeeze moulds on carriers in a midwestern foundry.

PRODUCTION INCREASE: More Than 300% Unit Costs Lowered

Shaking out squeeze moulds on Elevated Vibrating Shakeout.



Shakeout Hooded Belt Conveyor delivering foundry sand to elevator, screen and storage bin, from bin to mill; conditioned sand from mill to Eastern Aerator and distributing belt conveyor for delivery to moulders' hoppers.

Whether increased capacity or decreased unit costs or both interest you, Eastern Corporation's Foundry Engineers can show you how to achieve your objective by means of modernized layout, equipment and operating methods. The results obtained by the foundry illustrated on this page typify Eastern Corporation's service based on long experience, both in foundry operation and as manufacturers of foundry equipment.

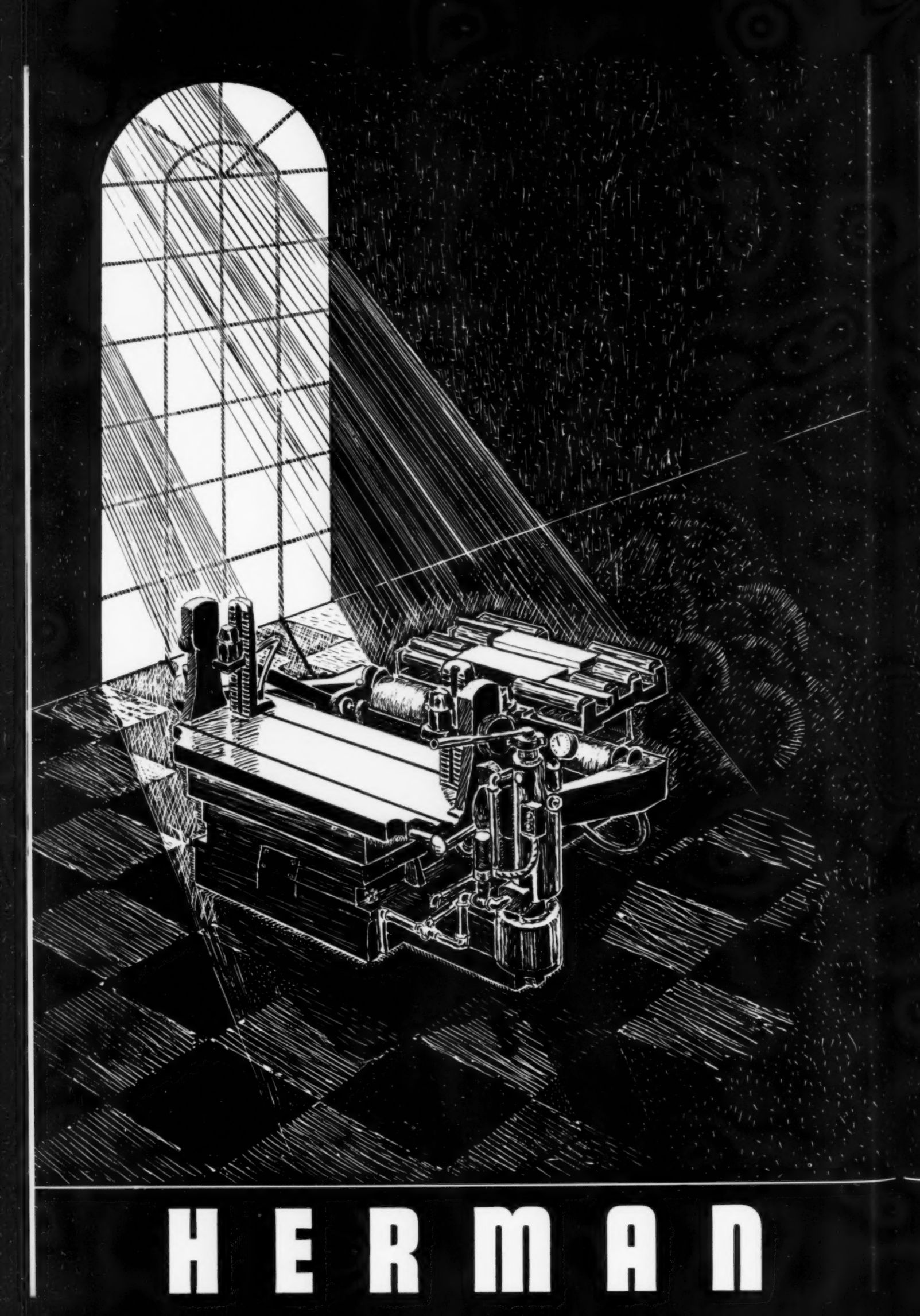
To start a preliminary discussion that will involve you in no obligation whatever, merely signify your interest.

EASTERN CORPORATION

BRANCH OFFICE:
565 W. Washington St., Chicago

GRAYBAR BUILDING, NEW YORK

DISTRIBUTORS: Henry M. Wood Co., Cincinnati · The Forker Corp., Cleveland · Walter Gerlinger, Inc., Milwaukee · John T. Hepburn, Ltd., Toronto


HERMAN

Visit

THE HERMAN BOOTH

SPACES D-6-8 and D-6-9

See the new Hermans put thru their paces! Learn how they can cut your molding costs, increase your production *and your PROFITS.*

MOLDING MACHINES

(*Continued from page* 80)

set a new 100-yard, metallic sights, official N. R. A. record of 500 x 500-38Xs, and made the amazing total score for the three matches of 900 x 900-69Xs.

♦ ♦ ♦

JOHN J. MURRAY has been appointed eastern representative for the Farrell-Cheek Steel Foundry Co., Sandusky, O. His office is located at 50 Church street, New York.

♦ ♦ ♦

E. C. KIEKHAEFER has been appointed chief engineer of the Stearns Magnetic Mfg. Co., Milwaukee. Mr. Kiekhaefer started with the company as draftsman and moved up to his present position through that of superintendent of the plant.

♦ ♦ ♦

WILLIAM P. MACDONALD has been appointed district sales manager of the New York territory by Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y. He will be assisted by C. F. HUTCHINS and L. W. KUNZMANN, with offices at 117 Liberty street, New York. Mr. MacDonald was identified with the engineering and estimating departments from 1909 to 1929 when he was transferred to the sales department as sales engineer.

♦ ♦ ♦

DANIEL WERTZ has been elected president of the Durbin Steel & Malleable Castings Co., Evansville, Ind., to succeed Votaw S. Durbin who died recently. The Durbin company is the successor of the Evansville Malleable Works.

CLAUDE WERTZ has been elected a member of the board of directors.

♦ ♦ ♦

ARTHUR E. SMITH, 320 Jackson building, Buffalo, has been made a representative of the Hammond Machinery Builders Inc., Kalamazoo, Mich. in western and central New York.

WILLIAM C. EDGAR, Oliver building, Pittsburgh, will represent the Hammond company in western Pennsylvania and northern West Virginia.

♦ ♦ ♦

A. C. HOWARD, assistant general manager of the main works, Fairbanks, Morse & Co., Beloit, Wis., since 1932, has been appointed general manager of the plant. CHARLES H. MORSE III has been named assistant general manager. A. E. ASHCRAFT, vice president in charge of manufacturing, who has been in charge of the Beloit plant, has assumed executive duties throughout all the factories of that organization in United States and Canada.

♦ ♦ ♦

HUGH E. BROWN, director of research, W. S. Tyler Co., Cleveland, was elected chairman of the Cleveland chapter, American Society for Metals, at the chapter's regular monthly meeting held April 4. HARVEY D. CHURCHILL, associate professor of mechanics, Case School of Applied Science, was named vice chairman. LOUIS W. KEMPF, research metallurgist, Aluminum Co. of America, was elected treasurer, and LEWIS F. HERRON, metallurgist, James H. Herron Co., was elected secretary.

♦ ♦ ♦

DR. JOSEPH SLEPIAN, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., recently was appointed associate director of the Westinghouse Research laboratories. He was born in Boston, and was graduated from Harvard university in 1911. He received his doctor's degree in 1913,

Dr. Joseph Slepian

and joined the Westinghouse company in 1917.

♦ ♦ ♦

LOUIS STOCKSTROM, president of the American Stove Co., St. Louis, since 1927, has been made chairman of the company. His son, ARTHUR STOCKSTROM advanced to the presidency, GEORGE E. BAKER was elected secretary-treasurer, and C. P. FISKE was made assistant treasurer.

♦ ♦ ♦

WILLIAM E. BEE, president of Palmer-Bee Co., Detroit, since its founding in 1905, has been made chairman of the board. GEORGE A. BEE is now president and general manager. J. E. MCBRIDE remains as vice president. A. J. LECKIE is treasurer and C. F. MCLAREN is assistant treasurer. D. N. SWEENEY, an attorney and former bank official, has become secretary and L. F. MILLER assistant secretary. N. B. KNIGHT is engineer in charge of an engineering and sales office recently opened by the company in Louisville, Ky.

♦ ♦ ♦

DR. C. H. DESCH, superintendent, metallurgical department, National Physical laboratory, Teddington, England, received the Bessemer gold medal at the annual meeting of the British Iron and Steel institute on May 4. Dr. Desch long has been distinguished as a teacher of metallurgical chemistry; having served as lecturer in that subject at the University of Glasgow, and as professor of metallurgy at the Royal Technical college, and at the University of Sheffield. Dr. Desch is author of a textbook, *Metallography*, and is a past president of the Faraday society, and president elect of the Institute of Metals.

♦ ♦ ♦

SIR ROBERT A. HADFIELD has been awarded the Trasenster medal and diploma for 1938 by the Association des Ingenieurs de Liege. This award has previously been made only to Henry Le Chatelier, the illustrious and universally-honored French scientist and metallurgist, the Marchese Marconi, Edouard Branly, the distinguished physicist and one of the pioneers of wireless, Georges Claude, inventor of the processes known under his name for the liquefaction of air and for the fixation of atmospheric nitrogen, Waldemar Lindgren, American geologist, and Andre Blondel, distinguished for his researches in electricity and illumination—each of international renown in their own spheres of scientific work.

♦ ♦ ♦

JOHN A. MOORE, formerly connected with Jackson & Church Co., Saginaw, Mich., has been appointed foundry superintendent M & H Valve & Fittings Co., Anniston, Ala. Mr. Moore was born in Ottumwa, Ia., in 1878 and served a foundry apprenticeship with the Fulton Foundry & Machine Co., Cleveland. Following a period of 5 years as a journeyman molder in several sections of the country he became foundry superintendent for the Oliver Mfg. Co., Knoxville, Tenn., in 1904. From 1911 to 1936 he held the position of superintendent or manager in several Detroit foundries including American Blower Co., Russell Wheel & Foundry Co., Acme Foundry Co., and the Michigan Valve & Foundry Co. division of the Timken-Detroit Axle Co. For a period of 5 years, 1922-1927 he was engaged in foundry consultation work.

♦ ♦ ♦

CHAMBERS R. CULLING, vice president and general manager, Carondelet Foundry Co., St. Louis, was elected president of the Gray Iron Founders' society at the annual meeting held in Buffalo March 25. Mr. Culling first began work in the foundry in 1911 during school vacations as an apprentice molder. Later he attended classes in mechanics and pat-

(*Concluded on page* 88)

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CARBORUNDUM

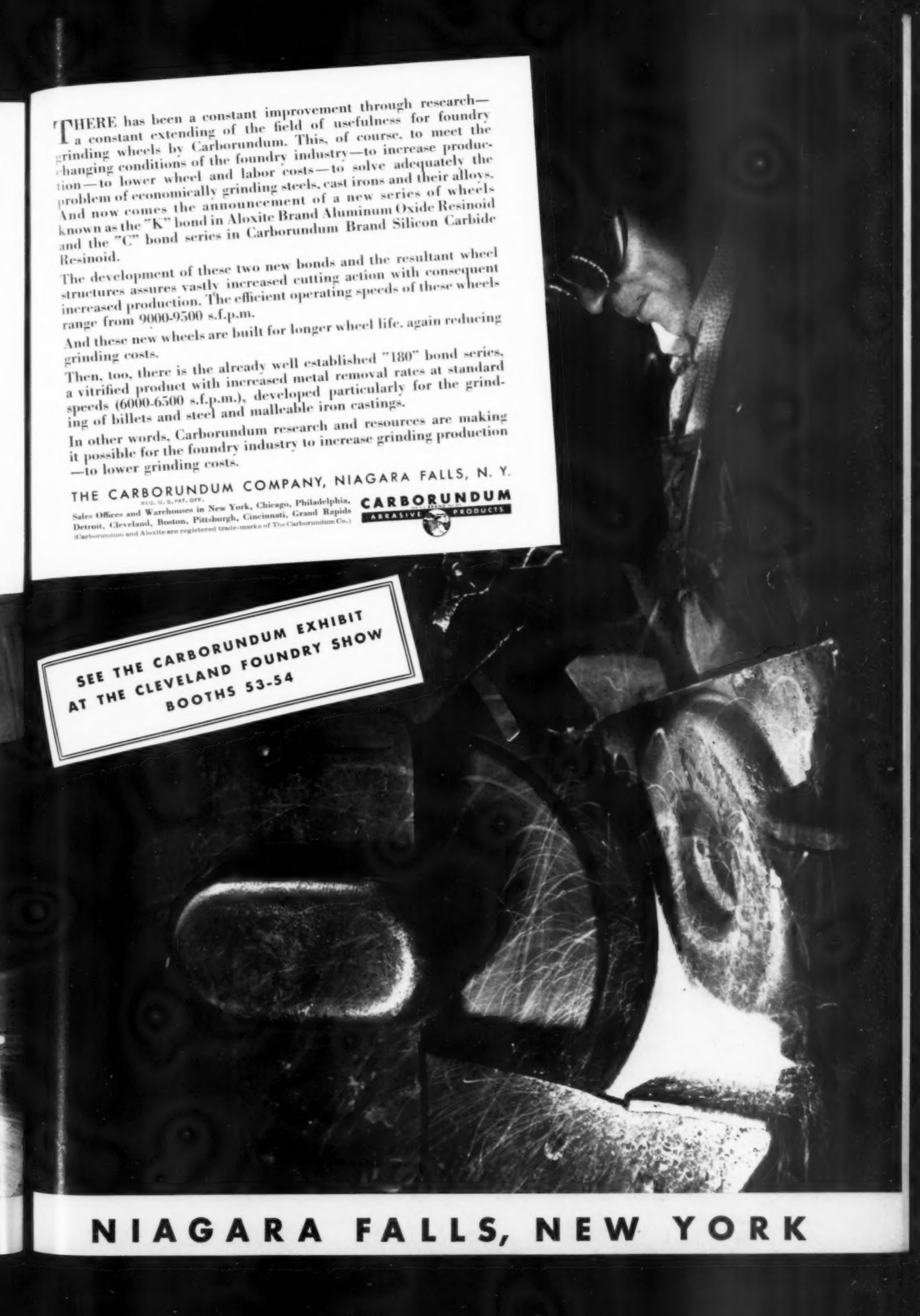
REG. U. S. PAT. OFF

announces

IMPROVED FOUNDRY WHEEL BONDS AND STRUCTURES THAT GIVE INCREASED CUTTING ACTION AND LOWER COSTS

THE CARBORUNDUM COMPANY

REG. U. S. PAT. OFF.



THERE has been a constant improvement through research—a constant extending of the field of usefulness for foundry grinding wheels by Carborundum. This, of course, to meet the changing conditions of the foundry industry—to increase production—to lower wheel and labor costs—to solve adequately the problem of economically grinding steels, cast irons and their alloys. And now comes the announcement of a new series of wheels known as the "K" bond in Aloxite Brand Aluminum Oxide Resinoid and the "C" bond series in Carborundum Brand Silicon Carbide Resinoid.

The development of these two new bonds and the resultant wheel structures assures vastly increased cutting action with consequent increased production. The efficient operating speeds of these wheels range from 9000-9500 s.f.p.m.

And these new wheels are built for longer wheel life, again reducing grinding costs.

Then, too, there is the already well established "180" bond series, a vitrified product with increased metal removal rates at standard speeds (6000-6500 s.f.p.m.), developed particularly for the grinding of billets and steel and malleable iron castings.

In other words, Carborundum research and resources are making it possible for the foundry industry to increase grinding production —to lower grinding costs.

THE CARBORUNDUM COMPANY, NIAGARA FALLS, N. Y.

REG. U. S. PAT. OFF.

Sales Offices and Warehouses in New York, Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh, Cincinnati, Grand Rapids

(Carborundum and Aloxite are registered trade-marks of The Carborundum Co.)

CARBORUNDUM
ABRASIVE PRODUCTS

SEE THE CARBORUNDUM EXHIBIT
AT THE CLEVELAND FOUNDRY SHOW
BOOTHS 53-54

NIAGARA FALLS, NEW YORK

(*Concluded from page 84*)
ternmaking at the David Ranken Jr. School of Mechanical Trades. Following that he became connected with the Remmers Pattern Co., St. Louis, as a patternmaker. In 1915 he began the study of mechanical engineering and at the outbreak of the World war in 1917 enlisted in the U. S. navy and served for 2 years on board the U. S. S. VESTAL in the engineers division. After discharge from the navy in 1919, Mr. Culling became foundry superintendent of the Security Stove & Mfg. Co., Kansas City, Mo., and worked in that capacity until 1924 at which time he became superintendent of the Carondelet Foundry Co. of St. Louis. In 1935 he succeeded his late uncle, Horace R. Culling, as vice president and general manager of the Carondelet organization.

♦ ♦ ♦

HAROLD S. STROUSE has been appointed vice president of the Harnischfeger Corp., Milwaukee. In addition to the new duties, he will continue to direct the activities of the treasurer's department which he has headed for the past 7 years. Mr. Strouse graduated from Purdue university in 1915 and then was connected with the Chicago Central Station institute for approximately a year. He then was business manager of the Interstate Public Service Co., Newcastle, Ind. At the outbreak of the war he entered the first officers' training camp at Ft. Benjamin Harrison, Indianapolis and saw overseas service with the 310th regiment of engineers. Following the war he was employed by the Western Electric Co., Chicago, as designer in the automatic telephone section. A short time later he became connected with the Harnischfeger Corp. as estimating engineer. In 1921 he was made advertising manager and in 1931 was elected treasurer of the firm. Two years later he became a director.

Harold S. Strouse

Book Review

Transactions of the American Foundrymen's Association, Vol. 45, cloth, 850 pages, published by the American Foundrymen's association, Chicago, and supplied by THE FOUNDRY, Cleveland, for $10, and in Europe by the Penton Publishing Co. Ltd., London.

This volume includes papers and committee reports presented at the 1937 convention of the American Foundrymen's association in Milwaukee. Included in the contents are papers devoted to various phases and practices in the different branches of the foundry industry; namely, gray iron, malleable iron, steel and nonferrous castings.

Papers of interest to gray iron foundrymen are those on wear testing, cupola high test cast iron, effect of coke size on cast iron, occurrence and control of ferrite in cast iron, a summarization of information available on graphitization and inclusions in gray iron, effect and composition and section size of plain cast iron, microstructure and physical properties of alloy cast iron, and cost methods used in gray iron foundries.

The malleable division is represented by papers on heat treatment of malleable irons, selection of cycle and the type of furnace for annealing, sand control in malleable foundries, melting developments and cost methods. The steel division will find papers on contraction stresses, test coupons, heat treatment, sand control, methods of producing steel for castings.

Of interest to nonferrous foundrymen are papers on sand control, the production of pressure-tight 30 per cent cupro-nickel castings, a discussion of problems in the manufacture of bronze castings, and nonferrous foundry cost methods. Of general interest are papers on refractories, radiography, etc.

Illustrations and tables are used generously throughout the book to correlate and supplement the material contained in the papers. A ten page cross index and an author's index are provided.

Forms Committee

Increasing interest in the need for research and standardization work on important problems in the field of radiographic testing has led the American Society for Testing Materials to organize a new committee to study those phases. The committee which is designated E-7 on radiographic testing is comprised of six subcommittees whose chairmen are as follows:

Subcommittee I on radiography of cast metal, C. W. Briggs, American Foundrymen's association; subcommittee II on technical research, H. E. Seemann, Eastman Kodak Co.; subcommittee III on radiography of welds and weldments, H. H. Lester, Watertown arsenal (temporary chairman); subcommittee IV on correlated subjects, W. P. Davey, Pennsylvania State college; subcommittee V on safety, E. W. Page, General Electric X-ray Corp., and subcommittee VI on programs, Lars Thomassen, University of Michigan.

Appointments Open

For the third consecutive year 4 appointments as research associates are being made available at Battelle Memorial institute, Columbus, O. The appointments are open to graduates of any accredited college or university. Preference will be given to those who have demonstrated marked aptitude for scientific research in industrial experience or by graduate study in chemistry, physics, metallurgy or ceramics. Appointments will be for a year and may be extended for a second year. Salary will be $1800 a year. Application forms and further information may be secured from Clyde E. Williams, director of the institute.

Is Wear Resisting

Beryl Metals Co., 515 Rebecca street, Spokane, Wash., has developed a process whereby it is claimed that beryllium is incorporated in welding rods and grinding balls, resulting in extremely hard, wear resisting products. The firm also is developing numerous other beryllium alloys and hard metals.

Symposium on Coal

American Society for Testing Materials, 260 South Broad street, Philadelphia, recently has published a 132-page pamphlet entitled, "Symposium on Significance of Tests on Coal". It contains 6 technical papers by outstanding authorities which form detailed discussions of the meaning of results of tests of coal. In addition to the papers the pamphlet contains discussion by other technologists. Copies of the publication may be secured from the society for $1 each.

Meet in Glasgow

Engineering societies have organized an international engineering congress to meet June 21 to 24 in Glasgow, Scotland. This congress will be part of the Empire exhibition which is being held throughout the summer in Bellahouston Park, Glasgow. Technical sessions, visits to plants, excursions and social events will make up the program.

ANNOUNCES

THE

New, Oscillating Molding Machine

A truly new and remarkable development in molding machines to be shown for the first time at the forthcoming Foundry Show in Cleveland.

SPO, Inc. cordially invites you to see these new machines in actual operation at Exhibition Hall, Booth E9, 1 and 2.

Detailed information on the new SPO oscillating molding machines will be gladly provided on request.

WELCOME
A·F·A
CONVENTION

SPO, Incorporated

Manufacturers of a complete line of Molding Machines and Vibrators
EAST 61st STREET and WATERMAN AVE., CLEVELAND, O.

VIEWING Foundry Developments AT SHORT RANGE

NUISANCE problem of controlling the discharge from the cupola stack has been solved satisfactorily by at least one foundry in the East. The stack is capped at the top and all the dust, sparks, smoke, gas and other results of combustion are drawn through long pipes and discharged into a cooling chamber where a settling tank and water sprays effectually remove foreign material. Near the close of the heat the gas enters the chamber at a temperature of approximately 1800 degrees Fahr. The same gas minus all foreign inclusions later is discharged into the atmosphere as thin, misty vapor, almost instantly dissipated at a temperature of 120 degrees Fahr. Residue in the bottom of the tank is removed by a slat conveyor and discharged into a dump buggy for removal. For the average heat of 40 tons the amount of residue removed in this manner is approximately 600 pounds.

* * *

White cast iron may be rolled into sheets retaining the white structure, and then heat treated to obtain temper carbon, or it may be rolled into sheets in which the formation of temper carbon is almost completed. In the latter case only an extremely short heat treatment is required to obtain the desired final structure.

* * *

Nickel-copper casting alloys containing from 3 to 10 per cent nickel sometimes are chill-cast to obtain density and to prevent evolution of gas. However, it is not always possible to employ the regulation chills, and therefore it becomes necessary to use something else. The following compositions are suggested as being suitable since they can be molded in the normal manner: Coarse graphite flake (1 millimeter diameter average), 85 per cent; 10 per cent bentonite; 5 per cent liquid binder (core oil, sodium silicate, etc.), and water to suit. That composition should be dried or baked after making into the mold. A second which can be used in the green state contains 97 per cent silicon carbide sand or grit (medium coarse); 2 per cent bentonite; 1 per cent liquid binder as mentioned previously, and about 2 per cent water.

* * *

RADICAL departure from the usual type of cupola recently was installed in a British gray iron foundry. Instead of a spout on the outside, through which molten metal may be tapped intermittently, or allowed to flow in a continuous stream, this cupola is provided with a small opening through the center of the bottom door. The bottom of the cupola is concave and the metal, as fast as it melts, flows through the central opening into a receiver. The receiver is mounted on wheels to facilitate removal when the bottom is dropped. Incidentally the receiver is provided with a spout through which the metal is poured directly into molds as they pass in regular order on a narrow gage track. A balanced weight attached to a lever is lowered on to each mold before it is poured. Originally a nozzle brick similar to that used in bottom poured ladles was placed in the bottom of the cupola. Later an annular type casting covered with refractory material was substituted and it is claimed remains in satisfactory condition for several days.

* * *

Two hundred and forty-six Invar type steel castings weighing 12,118 pounds will be employed in the compensating supports for the glass mirror of the 200-inch telescope which will be installed on the top of Mount Palomar in California. Castings contain 36 per cent nickel and are given special heat treatment to develop the desired physical properties as well as low coefficient of linear expansion, and to secure stabilization. The castings range in weight from 20 to 78 pounds.

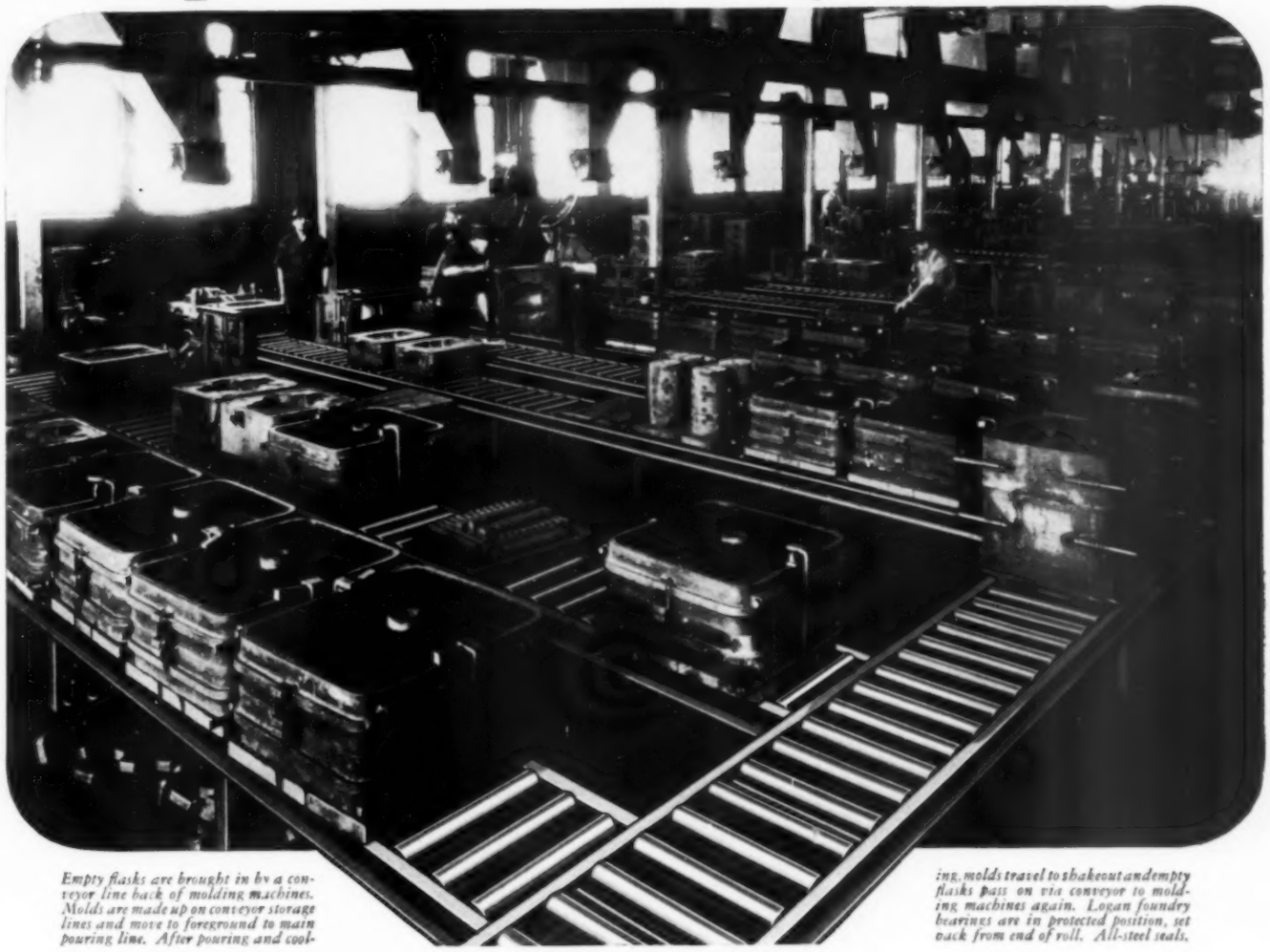
* * *

The new nickel-chromium-cobalt alloy which is cast into shape to form permanent magnets enabled a miniature locomotive constructor to design a compact, high power motor to drive them. The motor is only 2½ inches long and develops 1/100 horsepower on 1½ amperes and 6 volts. An idea of their power may be gained from the fact that a load of 7½ pounds bearing directly down on the motor truck is required to keep the wheels from spinning. As many as 50 cars have been pulled by one of the locomotives equipped with the new motor.

* * *

A DECIDED change from orthodox gating practice produces clean, solid, small gear wheels in a foundry devoted to production of textile machinery castings. Instead of a horn gate on the bottom or a pop gate on the hub, the metal enters the mold through a number of small gates cut into the top of the teeth. For example on a 15-inch diameter wheel, 3 inch face, web center, metal is poured into two sprues in diagonally opposite corners of the flask. Each sprue fills a basin runner in the joint of the drag. From this basin the metal flows into the mold through four small gates in the top of four alternate teeth.

No Traffic Jams
in this modern foundry!



Empty flasks are brought in by a conveyor line back of molding machines. Molds are made up on conveyor storage lines and move to foreground to main pouring line. After pouring and cooling, molds travel to shakeout and empty flasks pass on via conveyor to molding machines again. Logan foundry bearings are in protected position, set back from end of roll. All-steel seals.

Orderly material movement definitely cuts costs

Just as a well planned system of streets and boulevards eliminates congestion in city areas, Logan equipment keeps things moving swiftly and economically in the modern foundry.

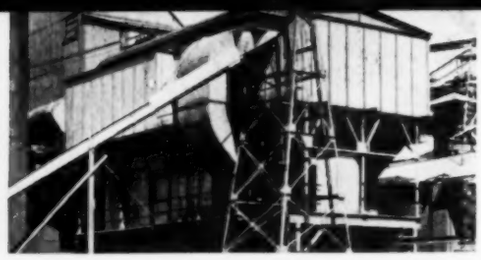
Efficient, correctly laid out installations like the one illustrated above not only promote orderliness, but save waste time, unnecessary effort, and waste of floor space. Such savings are directly reflected in lower operating costs. That is why foundries, in increasing number, now regard Logan Conveyors as essential production machinery, not simply as auxiliary equipment.

Have you checked all your material handling possibilities—in the movement of molds, in the handling of castings through machining? The nearest Logan engineer is at your service for consultation, or write on your letterhead for Bulletin 15. LOGAN CO., Incorporated, 580 Buchanan Street, Louisville, Ky.

MOVING IS 90% OF MAKING

Logan Conveyors
LOUISVILLE

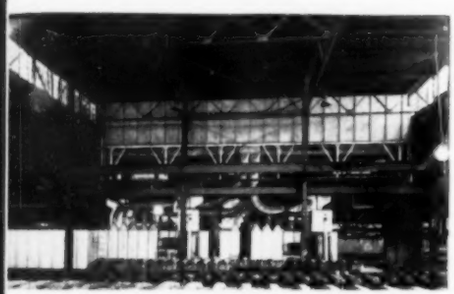
Clear the air of DUST at low cost



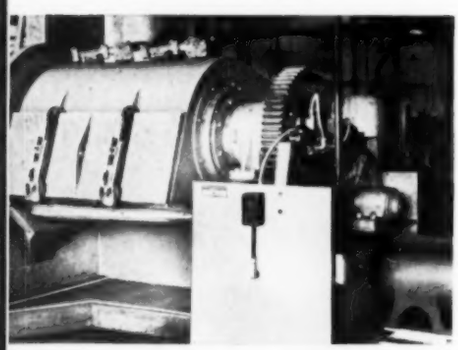
PARSONS

Oval Bag ARRESTORS

Handling dust from shakeouts.



Semi-automatic cleaning room . . dust arrestor overhead.



Parsons Oscillating Blast Barrel.

PARSONS DIRECT PRESSURE OSCILLATING BLAST BARREL

Cleans a full load quickly, smoothly, economically. One prominent foundry has installed four barrels in past two years.

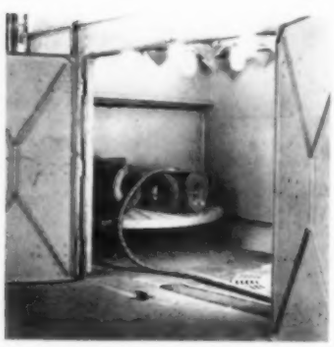
PARSONS BLAST ROOM

All Parsons Sandblast Rooms are custom-built, engineered to your specific requirements. Rugged construction . . proper ventilation . . excellent illumination, are all incorporated in Parsons design.

You win-- we win!

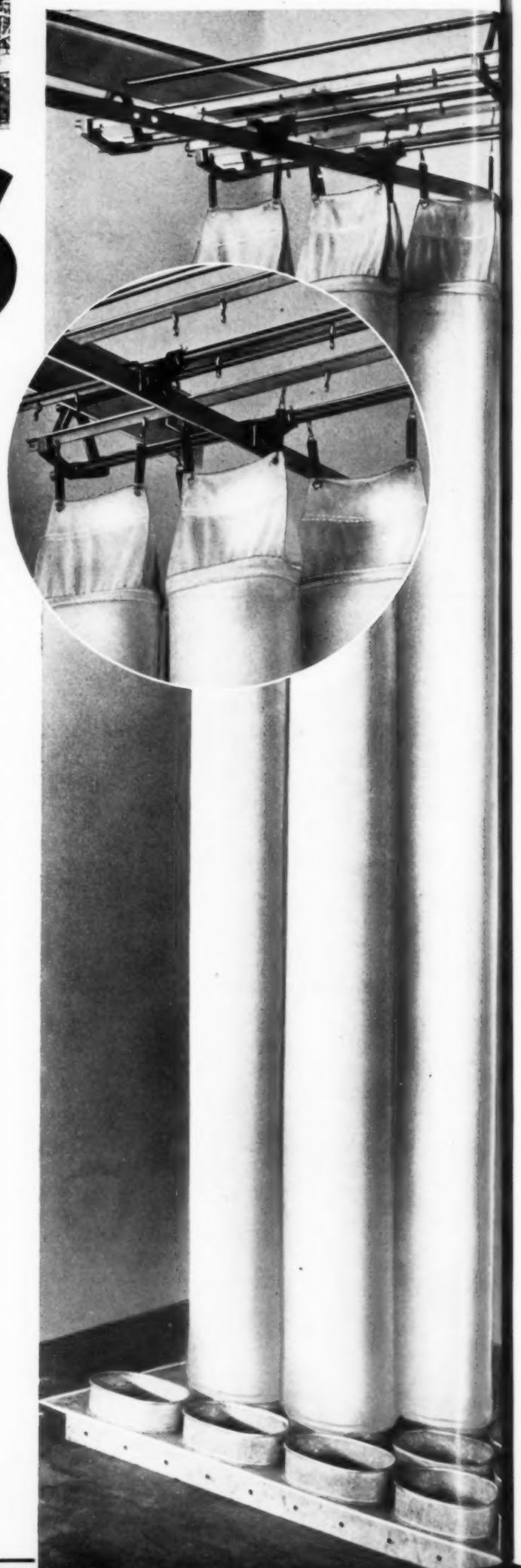
Your score is a PARSONS score. Hundreds of foundries have won over annoying dust problems at low cost by "signing up" with Parsons Dust Control.

OVAL BAG design of the Parsons dust arrestor prevents swirling action as the dust laden air enters bottom of bag, which eliminates cloth wear. The Oval Bag arrestor will not plug, allowing it to be used on even the most difficult shakeouts, resulting in the lowest back-pressure of any cloth arrestor.



Modern Parsons sandblast room with turntables.

Operating 4 years . . no bag replacements.



PARSONS ENGINEERING CORPORATION

3599 East 82nd St., Cleveland, Ohio

THE ADVENTURES OF BILL

By Pat Dwyer

Drawings by H. L. Ripley

LACKING the uninvited and usually impertinent advice of people who insist on telling me things for my own good, I am undecided whether to ascribe my present tolerant outlook on life and my placid disposition to creeping senility or to a species of wisdom that apparently only comes through age. Certain items that at one time aroused my whole hearted enthusiasm or my equally violent hostility, I now either completely ignore, or view with slightly amused indifference and toleration.

Curiously enough, in looking backward over the long trail leading up to the present peaceful and tranquil nook I find that my mental adjustment on so-called major issues occurred long before I ceased to point with pride, or with loathing as the case might be, to certain relatively minor items. Despite the most heroic effort toward the attainment of actual perfection I have not yet rid myself of some early prejudices that cling with the tenacity of burdock burrs to a cow's tail.

At the risk of being considered old fashioned I still cling to the idea that necessary attention to a person's face or figure should be carried out either in the great open spaces, or in privacy. In either case the patient endurance of the innocent party of the second part, would not be strained to the jumping off point. Indiscriminate flourishing of powder puffs, paint pots and lipsticks over faces that in many instances even a mother would view with alarm, does not raise the annoyance curve to any great extent. I reflect that native sons of America indulged in the same practice before and after discovery by their loving white brother. True, the white brothers introduced a new technique in nose paint, but that is another story.

I have difficulty in concealing my antipathy for the sleek lad who carries a comb in the upper vest pocket and about every 10 minutes draws it forth with a grand flourish and runs it through a mop of hair sufficient to stuff a horse collar. Usually the hair on the back is as short as the hair on the neck of a wrestler and the grand gesture applies only to the oily thatch on top. Perhaps another throwback to the Indian top knot or scalp lock.

With a mental reservation to boil over whenever I felt like boiling over I asked Bill how he stood on this question of how to behave in the presence of human pests who apparently played hookey from home and school during the period devoted to a discussion of deportment. On the principle of fighting fire with fire, had he by any chance developed a technique or a recipe for making these people realize their shortcomings?

Busy bees improve each shining hour

"Well," said Bill, "I'll tell you. I'm kind of stymied on the lip stick, paint pot and powder puff proposition. Y'understand I'm agin all these here now works and pomps of Satan, but each time I bring the subject up in the old family circle, I am asked pointed questions about men who chew tobacco in the parlor and smoke in bed. How would I like to have to live with one of these birds, hey? No use arguing with a woman. Certainly there is no use in attempting to tell her how to improve her appearance. That is woman's most engrossing occupation between the ages of 10 and 100 and it is only natural to assume that she complacently regards herself as something of an expert. Offhand and meaning no person in particular, I have seen better paint jobs in the Sunday funny paper than I often encounter on the street.

"By looking sharply and under certain strong lights perhaps you will notice that my hair is beginning to thin out slightly on top—"

"Did you ever hear the ditty about old Uncle Ned?"

"What about old Uncle Ned?"

"There was an old darky and his name was Uncle Ned and he died many long years ago. He had no hair on the top of his head, the place where the wool ought to grow! Perhaps you remember it better in the more refined and ornate version: There was an ancient colored individual whose cognomen was Uncle Edward and he departed from this mundane sphere at an extremely remote period. He had no capillary substance on the summit of his

(*Continued on page* 96)

The Great Lakes Line

Molding Sands
Bank Core Sands
Lake Core Sands
Crude Silica Sands
Ottawa Silica Sands
Silica Flour
Great Lakes Coroil
Bentonite
Clay Bond
Fire Brick
Nepheline Syenite
Refracto Fire Clays
Refracto Firestone
Mica Schist
Canister Silica Grits
A B C Foundry Coke

BLAST SANDS
Diamond
Flint Shot
Gem Quartz
Muscatine
Gold Jacket

Steel and Metallic Abrasives
Alloy Iron Nozzles
Stoody Borium Nozzles
Mill Stars
Limestone
Dolomite

The right sand for molds—the right sand for cores—reduce scrap losses, make cleaning easier. Those things mean lower costs. And right *now* especially—that's what you're after.

That's one reason the popularity of Juniata Bank Sand is increasing every day as a base for synthetic molding sand used in the production of light to medium weight castings. The grains have a priming coat to which Bentonite and clay bond readily adhere. Also—when used as a facing, it improves finish—minimizes metal penetration.

Its natural cleanliness and soft, silky texture gives it remarkable green strength—stand-up-ability. Its high silica content and fusion temperatures permit its use over and over again.

That's sand economy!

In short, Juniata is the one sand covering the widest range of uses in the foundries of the United States and Canada.

All three of our bank sands, Juniata, Wilmot and Lake Cicott, when used alone or in any desired proportion with other silica or lake core sands, require a minimum of binder and give maximum permeability because of their good grain distribution.

Let's renew acquaintances at the Cleveland Foundry Show. We'll be waiting for you in Space 39.

BUY GREAT LAKES!

Great Lakes

Miners—Processors—Foundry, Metallurgical

Juniata

Representative screen tests and chemical analyses of our medium grade Juniata Bank are as follows—

On 30 screen	.1
On 40 screen	.2
On 50 screen	1.3
On 70 screen	5.7
On 100 screen	26.25
On 140 screen	43.2
On 200 screen	18.15
On 270 screen	4.2
Pan	.5
Clay	Under 1.0%
A.F.A. Fineness	100
Distribution	75 to 100
Base Permeability	40
Permeability @ 3.5% water	78

Chemical Analysis

Silica	92.09%
Iron & Aluminum Oxide	6.09%
Calcium Oxide	.58%
Magnesium Oxide	.22%
Loss on Ignition	1.02%
Fusion Temperature	3100 deg. F.

Wilmot

From our Wilmot deposits we mine our most open bank sand. It is recommended for cores and base molding for medium weight to medium heavy castings.

A.F.A. Fineness 58—Distribution 79—Base Permeability 105—Clay under 1%.

Lake Cicott

From the largest bank sand operation in Indiana we produce screened Lake Cicott sand. Like our other bank sands it is recommended for cores and base molding. Its clay content permits maximum green strength.

A.F.A. Fineness 83—Distribution 100—Base Permeability 53—Clay Content 2 to 4%.

As much as you want when you want it

from OUR OWN PITS

That's what you get when you order any of our sands. That, and something more—the use of our laboratory and technical departments which are available without charge.

As pioneer producers of bank sands, particularly in the famous central Michigan district, we ask for an opportunity to supply the sands you need.

Write us today.

Foundry Sand Co.

and Sand Blast Service Detroit, Michigan

(*Continued from page* 93)
cranium, the locality where capillary substance of this character usually vegetates!"

"Ignoring the scurrilous and without doubt envious implication of the weasel eyed representative from Tinker's Creek we shall carry on. How would you like to take your colored Uncle Edward by the hand and take a long running jump together into the same creek? I rather fancy, old thing, that will hold you for the nonce—whatever a nonce is.

"Before you dragged your wooly old relative into the discussion I was going to say that the comb wielders do not arouse a feeling of active antagonism. I would hesitate at snatching the comb and stamping it under foot, but on the other hand I would weep no salty tears if the dog catcher snared the performers into his little wire coop and dragged them off to valet his other charges.

"I had one of these human pomeranians working for me one time. So long as he remained upright, an occasional fling of the head like a wild mustang scenting the breeze, was all that was required to keep the fringe out of his eyes. Stooping over a job in the floor, the stuff came tumbling down like that whatda-ya-call-it waterfall at Lahore, or as the cynical master mechanic passing through the shop one day, said, like sea weed round a clam. About every 15 or 20 seconds by any reliable stop watch he had to throw back his head in a kind of a circular motion to lay the banners back of his ears. He was a long, skinny guy and his performance for all the world would remind you of a half grown rooster sipping his morning's morning out of a puddle. A dip, a suck and then a gulp with the bill pointing in the general direction of the North star. Veiled hints, jocular remarks and even brutally earnest requests to chop it off for

The kangaroo ain't sayin' nothin'

the lovapete, slid off his oily poll like goose grease squirting through a tin horn. One Valentine day A Friend sent him one of the horrible love tokens circulated freely among all civilized people on that day. The picture was of Jo-Jo, the dog faced boy, and the accompanying bit of doggerel drew certain invidious comparisons. Did he get his hair cut? Not this sturdy and independent citizen. He gathered up his tools and quit.

"Speaking of Jo-Jo reminds me that up to the present you have monopolized the conversation to such an extent that I have had no opportunity to discuss a long distance letter duly delivered into my hands a few days ago. Do you remember a story about a kangaroo that went the rounds of all the newspapers and comic magazines longer ago than you could tell me and about twice as long ago as I could tell you? After the paper got tired kicking it around, the vaudeville boys snatched it to their bosoms and in their weird vernacular just slayed the patrons right in the aisles with it. I have seen or heard no reference to the story for many years either in the press or on the stage, but I confidently expect that one of these nights a radio wit will spring it as his own original creation."

"I have some recollection of a kangaroo story in which Kang Jr. is lost and the mother kangaroo has some pointed remarks about pick pockets—"

"Purry good. I remember that one, but the one I had in mind is about a kangaroo in a cage. In the smaller towns, the story teller always had the cage in a circus. In the larger cities he invariably had the cage and the kangaroo in the local zoo. Personally I don't believe there is a kangaroo in any zoo in the United States, but that is neither here nor there. What the people don't know, won't hurt 'em.

"In this story, two middle age daughters of Erin (old spelling) are depicted standing in front of a caged kangaroo. One says to the other 'What kind iv a baste is that at all at all? Wid a tail onto him as long as me Uncle Mick's cabbage patch.'

" 'Not so loud,' says the other. On the tag here it says kangaroo, a native of Australia.'

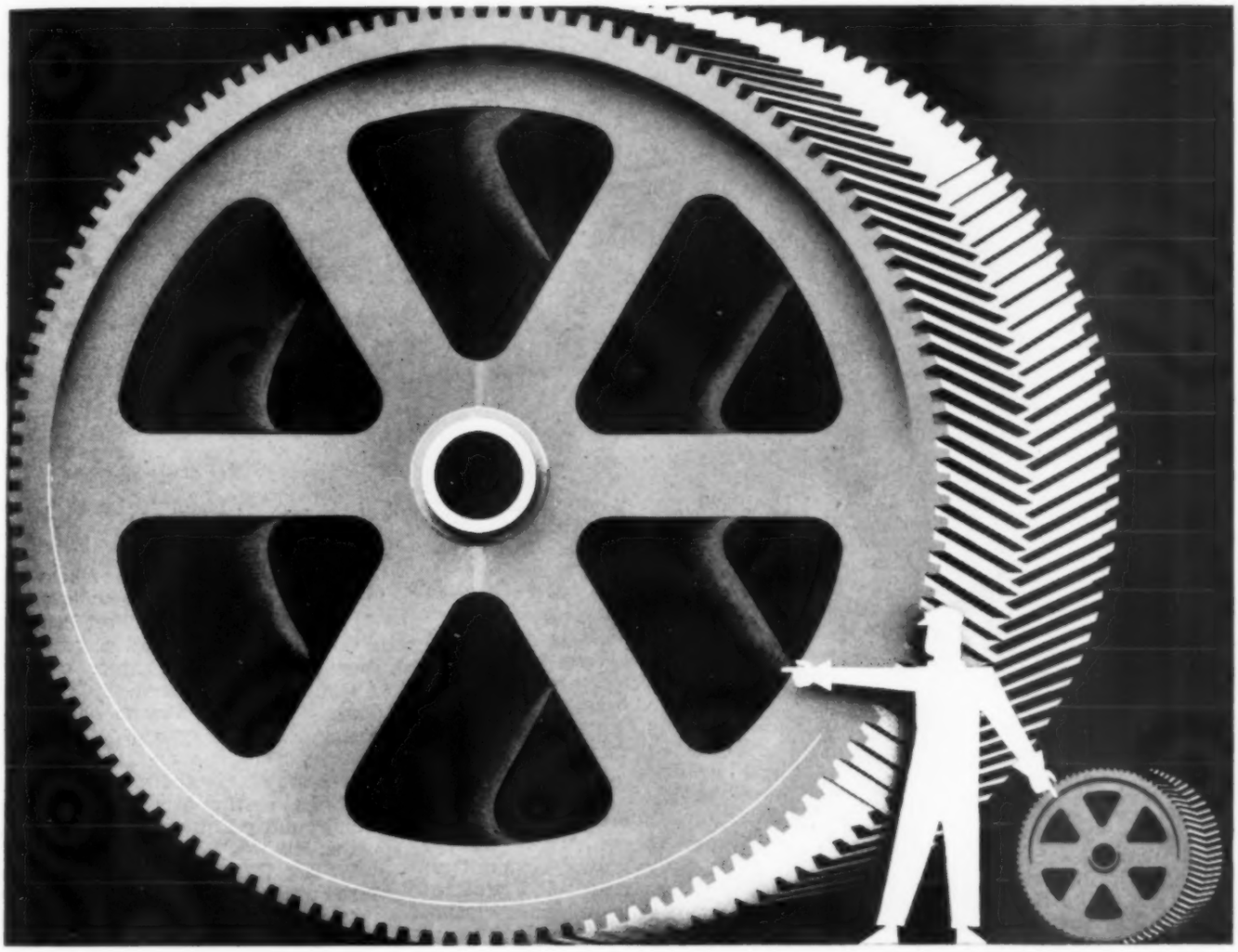
" 'A native iv Australia? The blessed saints be betwixt uz an' all harm! Me cousin Kitty Anne who went out there a few years ago, wrote home last summer that she is married to one iv thim fellas!' "

"Now that you have dredged the old veteran out of the mists of antiquity, I remember my father chuckling over that same story and me a little gossoon in corduroy knee breeches. However, I fail to see the connection between the kangaroo and the long distance letter."

"My error, my dear young fellow, my error. I did not mention that this long distance letter came from Australia. Apparently some of the native sons are as vague in their impressions of America, as some of our people are in regard to Australia. This citizen wrote me that he proposes to attend the convention and exhibition of the American Foundrymen's association as part of a tour through the United States. He would appreciate any helpful hints on modes of travel, necessary equipment, main trails and water holes, detours to avoid buffalo herds and Indian war parties and where he could pick up a reliable interpreter familiar with the various dialects. Would it be advisable to carry his own tent or could he depend on securing accommodation for man and beast in one of the tepees, wickiups, or probably in the long house erected on the fair grounds. A friendly lad. He ad-

(*Concluded on page* 144)

Foreign visitor learns that taxes are collected in this land of the free



DIFFERENT IN SIZE . . . ALIKE IN STEEL

It's a big jump from a 36-inch gear to one of 16 feet weighing 53,000 pounds. Yet their case histories show that such widely varying sizes can be handled with one steel. In these instances a Manganese-Molybdenum (0.15 to 0.20% Mo) steel was used.

In the large gear simple annealing, normalizing and drawing proved sufficient to produce uniformly good physical properties. The smaller gear permitted oil quenching and drawing to even higher physical properties. And, despite the wide variations in sections, no casting defects or machining difficulties were encountered in either of the two products.

Such is the versatility of Moly cast steels. Our free book, ***"Molybdenum in Steel,"*** tells more about them; and our accumulation of practical field data is available to engineers and production executives toward the solution of any specific iron or steel problem. Climax Molybdenum Co., 500 Fifth Ave., N. Y.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

Climax Mo-lyb-den-um Company

MOLY

Twin City

TWIN City Foundrymen's association met March 21 for dinner at the North Central Commercial club, St. Paul. After dinner the meeting adjourned to the plant of the Union Brass & Metal Mfg. Co., St. Paul, where the coreroom, melting, finishing, polishing and plating departments were in operation for the benefit of the visitors. A heat was melted in an electric furnace and poured. The following officers of the company were hosts to the group: H. J. Michel, president; H. J. Kaim, vice president and plant manager; C. Becker, treasurer; George Gerlach, sales manager; Fred Kaim, chemical engineer. Mr. Kaim gave a brief description of the processes involved.

At a meeting of the Twin City Foundrymen's association held Jan. 17 at the University of Minnesota, Dr. H. L. Campbell, chief metallurgist, American Hoist & Derrick Co., St. Paul, gave an interesting lecture on "Materials for Molds and Cores." The lecture was illustrated by blackboard outline and lantern slides and was followed by a lively round table discussion.—*O. W. Potter, president.*

Quad-City

MARCH meeting of the Quad City chapter of the A. F. A. was held at the Blackhawk hotel, Davenport, Iowa, March 21, with 85 present for the dinner and approximately 125 for the technical session. P. T. Bancroft, chairman, presided.

Parker Woods, M. W. Warren Coke Co., St. Louis, gave a short talk with movies of his experiences in Mexico and in Connie Mack's training camp. This proved to be very interesting with outstanding scenes of bull fights and action pictures of the ball players at camp.

Garnet P. Phillips, International Harvester Co., Chicago, presented an interesting talk on "Cupola Practice," discussing operation and maintenance. He described the operation of the cupola as essentially the burning of fuel in direct contact with the metal to be melted, superheating and cleaning by the use of a flux. Essential requirements to be met in cupola construction were considered and shown by slides. Various mixes to fit certain needs of the automotive and farm implement industries were explained. Many questions and much discussion followed the talk.

Chairman Bancroft appointed the following nominating committee: A. E. Hageboeck, Frank Foundries Corp., chairman, John Ploehn, French & Hecht Inc. and H. F. Henninger, International Harvester Co., Rock Island, Ill. This committee will report its nomination at the April meeting and the election will be held in May.—*J. Morgan Johnson, secretary.*

Connecticut

CONNECTICUT Foundrymen's association held its 213th meeting March 25 at the Home club, Meriden, Conn., with 37 members present. George R. Holmes, president of the association, presided at the meeting and in the absence of Secretary N. J. Stringer, C. S. Parker served as secretary. C. S. Neumann, Union Mfg. Co., told the association of the death of J. H. Sleath, long a member of the group, and the association expressed its sympathy to his family.

Henry Griggs, Waterbury Farrell Foundry & Machine Co., Waterbury, Conn., gave an interesting talk on "Alloy Irons" and Robert Mills, Manufacturers Foundry Co., Waterbury, conducted a round table discussion on "Cylinder Castings." Henry Griggs, chairman of the program committee, outlined the tentative program of speakers for the coming meetings of the year.—*C. S. Parker, acting secretary.*

Pittsburgh

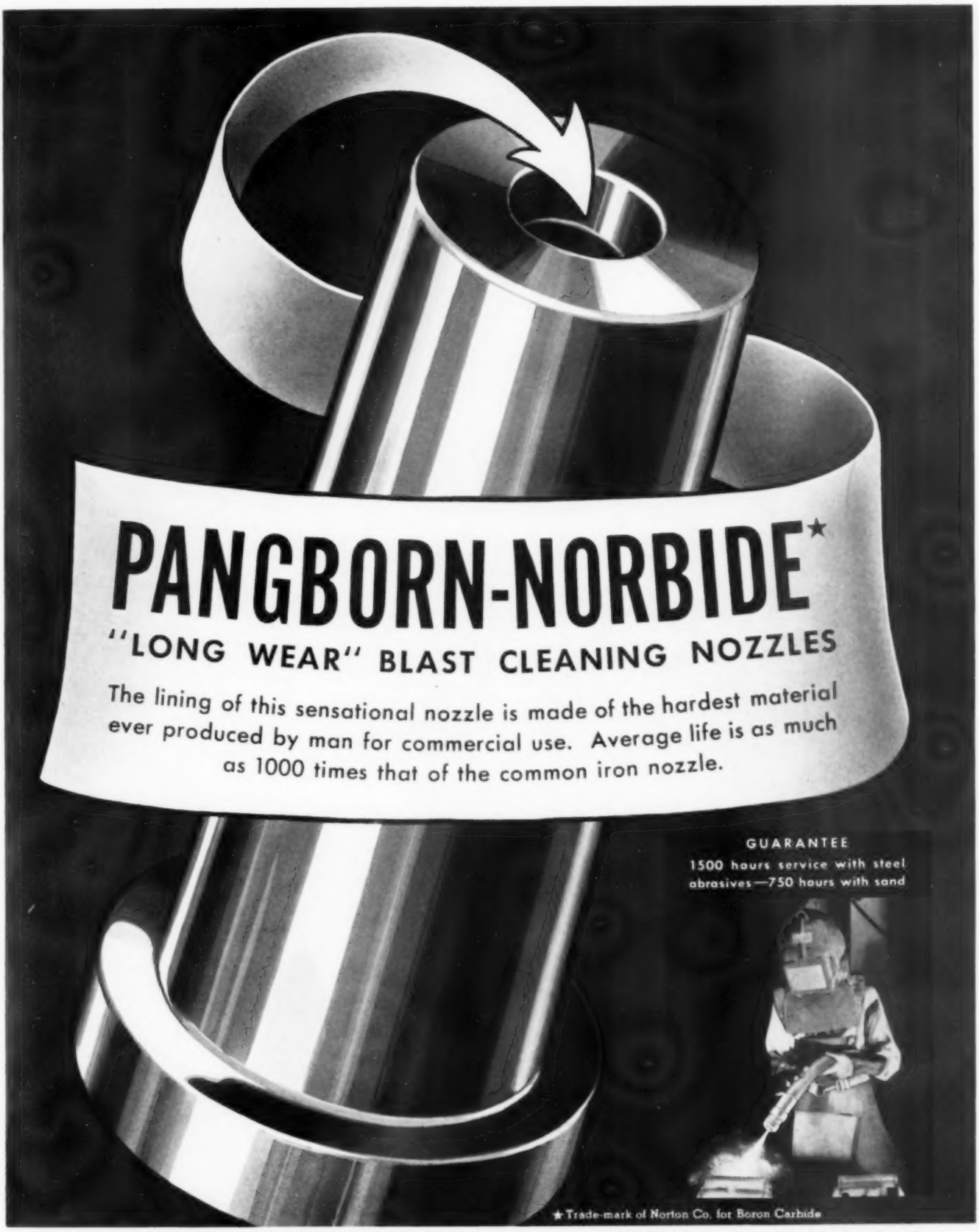
AN INTERESTING program was presented to the members of the Pittsburgh Foundrymen's association March 21 in the Fort Pitt hotel, Pittsburgh. A word of greeting from the Chicago chapter of the A.F.A. was delivered by James Thomson, past chairman and a director of that group. The 130 foundrymen present were shown the wheelabrator method of cleaning castings in a film prepared by American Foundry Equipment Co., Mishawaka, Ind.

Walter H. White, past president, Pittsburgh Foundrymen's association and general superintendent, Pittsburgh Rolls division, Blaw-Knox Co., Pittsburgh, and F. L. MacQuarrie, chief engineer of that company, discussed "Manufacture and Use of Iron and Steel Rolls." Mr. White discussed processes and problems arising in the production of the various types of rolls used in steel mills. His talk was presented in the form of comments on a series of lantern slides.

Mr. White outlined the procedure used in making the rolls, from the making of the patterns, setting of chills and methods of pouring through the finishing operations necessary on the finished rolls. Troubles encountered in making various types of rolls were described and the various types of rolls cast were illustrated by slides.

Uses of rolls were described by Mr. MacQuarrie in the second half of the paper. He also pointed out some of the misuses to which rolls are subjected and causes of roll wear and remedies for them. The speaker showed the general aim of all roll manufacturers is to make rolls suitable for a wide variety of uses; he demonstrated some of the variables encountered in rolling mill practice which make the manufacture of rolls a difficult problem; and he showed the need for intense study

(*Continued on page* 101)



PANGBORN-NORBIDE*

"LONG WEAR" BLAST CLEANING NOZZLES

The lining of this sensational nozzle is made of the hardest material ever produced by man for commercial use. Average life is as much as 1000 times that of the common iron nozzle.

GUARANTEE
1500 hours service with steel abrasives—750 hours with sand

*Trade-mark of Norton Co. for Boron Carbide

SEE THESE NOZZLES AT OUR A. F. A. DISPLAY IN CLEVELAND

PANGBORN CORPORATION

The World's Largest Manufacturer of Blast Cleaning and Dust Collecting Equipment

HAGERSTOWN - - - - MARYLAND

Cleveland Promises Many Treats

The TABOR Mfg. Co.
TABOR TRADE MARK
6225 Tacony Street
PHILADELPHIA, PA.

MAKERS OF TABOR
MOLDING MACHINES

Memo to Adv. Dept.
Read this →
Then get up an invitation
to all the visitors to
drop in at our display—
make it ring with
cordial sincerity!
Three of Tabor's 1938
developments will be
mighty welcome to
Foundrymen who are
really serious about
producing their jobs
at figures that will
let them stay in
business—

committee, the above address, or from the American Foundrymen's Association headquarters, 222 West Adams Street, Chicago, Ill. Requests for tickets are handled in order received, with the earliest dated requests receiving first consideration. Tickets are sold only in the number of seats available. Requests for seats are filled in order received and when all available seats are sold no further ticket orders will be accepted.

Interest in the exhibition of foundry equipment and supplies promises one of the finest and most instructive shows in recent years. According to C. E. Hoyt, executive vice president of the association and manager of exhibits, 200 firms already have reserved space in the large and well equipped underground exhibition hall and this total will be increased as the time for the opening of the exhibition approaches.

The opening session at 9:30 A.M ... annual convention of th ...

--and suggest visitors
make a note that our
space is E-11, 3-4-5-6
F.R.W.

OK, Frank!
Here it is!
Didn't think it
necessary to mention
our complete foundry
equipment line
M

ADVT.

(*Continued from page* 98)

which will lead to actual knowledge of the multitude of variables which enter into the deformation of iron, steel and other metals in rolling. According to Mr. MacQuarrie by gaining actual knowledge of these variables, the present *art* of roll making can be converted into an exact science.—*R. L. Hartford.*

Birmingham

THE Birmingham District chapter of the A. F. A. met March 18 at the Tutwiler hotel, Birmingham. R. R. Deas Jr., American Cast Iron Pipe Co. and chairman of the chapter, welcomed the 80 members and friends to the session and made several comments on the joint meeting held in February. Secretary R. C. Harrell reported the board had appointed the following committee to nominate officers and directors for the coming year: William Oberhelman, Hill & Griffith Co., Birmingham, chairman; Harry Mouat, Whiting Corp., Birmingham; S. D. Moxley, American Cast Iron Pipe Co., Birmingham; Gordon Jones, U. S. Pipe & Foundry Co., Bessemer and Biddle Worthington, McWane Cast Iron Pipe Co., Birmingham.

Secretary Harrell read the minutes and financial report of the Jan. 21 meeting and showed the chapter progressing and in good financial condition. The minutes of the Sixth Joint Foundry Practice meeting and the financial report were read and the secretary commented on the large attendance. Chairman Deas announced that the transportation committee to work with the A. F. A. for the Cleveland convention in May would be appointed later.

In the absence of W. W. McMahon, program chairman, J. E. Reynolds, U. S. Pipe & Foundry Co. and vice chairman, took charge of the meeting and introduced Charles Saunders, Tennessee Coal, Iron & Railroad Co., as chairman of the round table discussion on the cupola and its equipment. An interesting discussion followed with the Acipco hot blast cupola and the McWane balanced blast cupola bearing the brunt of the questions and discussions.—*R. C. Harrell, secretary.*

Milwaukee

MILWAUKEE chapter of the A. F. A. met at the Schroeder hotel, Milwaukee, March 18, with approximately 110 members and guests present, the guests chiefly from the Fox River valley.

Walter Gerlinger, Walter Gerlinger Inc., and chairman of the chapter, called for a report of the nominating committee which consisted of L. D. Harkrider, General Malleable Co., chairman, E. N. Carpenter, Carpenter Bros., and Oscar Woehlke, Liberty Foundry Co. Mr. Harkrider reported the following nominations: Roy M. Jacobs, Standard Brass Works, for chairman; W. J. MacNeill, Federal Malleable Iron Co., for vice chairman; B. D. Claffey, General Malleable Co., for secretary; W. J. Donnelly, Smith Steel Foundry Co., for treasurer; H. R. Donald, Interstate Supply & Equipment Co., and Ray Flansberg for directors with terms of three years. A. F. Genthe, Harnischfeger Corp., was nominated director for a 2-year term to fill the vacancy caused by the nomination of B. D. Claffey as secretary.

The election will be held at the April meeting. Chairman Gerlinger appointed the following tellers for the April election: R. F. Jordan, Sterling Wheelbarrow Co., chairman, M. A. Karrer, Crucible Steel Casting Co., and R. D. Cook, Rundle Mfg. Co.

Chairman Gerlinger announced that efforts were being made to run a "Milwaukee Special" to the A. F. A. Convention in Cleveland and that a committee consisting of W. F. Bornfleth, chairman, Ray Kelly and A. C. Ziebell, would be in charge of arrangements.

E. W. Page, manager of industrial sales of the General Electric X-Ray Corp., Chicago, gave an interesting, illustrated talk on the use of X-rays for castings. Mr. Page stressed the fact that he did not recommend the use of X-rays for routine inspection of castings and that the best field of application is in working out foundry difficulties.—*W. J. MacNeill, secretary.*

Southern California

SOUTHERN California chapter of the A.F.A. held its regular monthly meeting at the Mona Lisa, Los Angeles, March 17. One hundred and four members and guests were present at the dinner.

Speaker of the evening was Leroy P. Robinson, director of core oil sales, Werner G. Smith Co., Cleveland. Mr. Robinson's talk was entitled "Coreroom Problems" and covered the selection of core sands, binders, proper ratios, moisture control, mixing, baking and venting. A general discussion followed which brought out many interesting opinions.

Robert Gregg, Reliance Elevator Corp., chairman of the chapter, presided. Chairman of the membership committee E. F. Green, Axelson Mfg. Co., reported the chapter has 108 members. M. S. Robb, Bethlehem Steel Co. and D. W. McCrystal, Hercules Foundries Inc., were appointed to act as the transportation committee for the coming Foundrymen's convention at Cleveland. A number have signified their intention of attending the convention.

Among the guests present were V. A. Crosby, metallurgical engineer, Climax Molybdenum Corp., Detroit, and Fred J. Walls, metallurgical engineer, International Nickel Co., Detroit. Mr. Walls, spoke briefly bringing greetings from the headquarters of the American Foundrymen's association which he had visited recently.—*M. S. Robb, chairman, publicity committee.*

Metropolitan

A TENDENCY to make foundry facings too complicated exists among foundrymen, according to N. J. Dunbeck, Eastern Clay Products Co., Eifort, O., in a talk before the Metropolitan New York-New Jersey chapter of the A. F. A. at the Essex House, Newark, N. J., March 21. Mr. Dunbeck urged a start toward simplification and suggested facing sand mixtures for ferrous and nonferrous castings. While the mixtures proposed may not necessarily serve in all cases, he believes they will prove practical for average operations. He also believes that more facing than necessary is used, and that closer observation of actual requirements will result in interesting savings.

For steel castings weighing up to 150 pounds in green sand, Mr. Dunbeck suggested a mixture of 1900 pounds of old sand, 25 pounds of fireclay, 10 pounds of bentonite, 3 pounds of cereal binder and 4 per cent water. That mixture is used in foundries without a sand reclaimer. Where a sand reclaimer is available, the mixture is composed of 1300 pounds of old sand, 700 pounds of new sand, 40 pounds of fireclay, 15 pounds of bentonite, 4 pounds of cereal binder, and 4 per cent water. Mr. Dunbeck also suggested facing mixtures for steel castings weighing up to 4000 pounds in green sand; up to 8000 pounds in dry sand, and up to 90 tons in dry sand.

Gray iron and malleable castings were divided into 5 classifications according to weight, and one formula would serve each classification according to the speaker. The classifications are light up to 20 pounds, light-medium 20 to 50 pounds, medium 50 to 200 pounds, medium-heavy 200 to 1000 pounds, and heavy dry sand work. A suggested facing sand mixture for medium castings contains 1800 pounds of old sand, 200 pounds of silica sand, 100 pounds of fireclay, 110 pounds of sea coal, and 4.5 per cent water.

For small nonferrous castings weighing up to 5 pounds Mr. Dun-

(*Continued on page* 104)

RECONDITION Your Sand

EARN EXTRA PROFITS

CUT YOUR SAND COST

A survey discloses that sand costing $3.21 per ton may be replaced by a 20% new and 80% recovered sand mix costing 35 cents per ton.

WASTE SAND

Hydro-Blast returns the recovered sand with a predetermined moisture content and desired grain size.

MOISTURE CONTROL

The controlled grain size and moisture content assure the proper analysis for the work intended.

PER-MEABILITY CONTROL

The recovery of approximately 80 per cent of usable sand from former waste matter is possible with Hydro-Blast.

RECOVER MATERIALS

Sand Recovered, Washed, Graded

The Hydro-Blast Method of Sand Recovery washes, classifies, dries and grades all excess sand removed from the casting during the cleaning operation, and prepares it for highly profitable reuse for cores and facings. Savings effected quickly return the required amount of capital investment since the usual loss of sand cost is a factor of utmost importance, especially in foundries producing large heavily cored castings.

Hydro-Blast Sand Recovery gives you four advantages:

❶ Return of your capital investment in about one year. ❷ Moisture control. ❸ Permeability control. ❹ Handsome profit on previously wasted materials.

Write for the new Hydro-Blast Bulletin No. 105

HYDRO-BLAST Corporation

111 W. WASHINGTON ST., CHICAGO, ILL.

HYDRO-BLAST YOUR CASTINGS

Clean with Wet SAND *and* WATER

The Hydro-Blast wet sand and water method for cleaning castings projects 60 to 70 pounds of wet sand and 25 to 30 gallons of water per minute at extremely high pressures exceeding 1,000 pounds per square inch. Less than 25 H.P. and no compressed air is required to reach and clean interior cores, complex pockets and all parts of the casting without the tedium, expense and dirt of pneumatic core chipping.

Without Creating Dust, Hydro-Blast performs four highly essential foundry functions:

❶ It accomplishes preliminary sand chipping. ❷ It shoots hard complex cores. ❸ It cleans the casting. ❹ It classifies the sand.

SAVE TIME

Direct labor savings up to 90 per cent are being made daily by the Hydro-Blast proved wet sand cleaning method.

SAVE MONEY

If you have the necessary tonnage, Hydro-Blast will return your capital investment within the first year.

SAVE HANDLING

Castings are conveyed directly to the Hydro-Blast room without requiring any pneumatic core chipping.

SAVE MAINTENANCE

Hydro-Blast creates no dust and requires no investment in dust collecting equipment or maintenance thereof.

HYDRO-BLAST Corporation
111 W. WASHINGTON ST., CHICAGO, ILL.

See us at Booth 25, Cleveland, May 14-19.

THE ORIGINAL
Big Apple Barrel

(*Continued from page* 101)

beck suggested a facing sand comprised of 1800 pounds of old sand, 200 pounds of silica sand, 50 pounds of fireclay, and 6 per cent water. For larger castings up to 35 pounds the mixture is composed of 1800 pounds of old sand, 200 pounds of silica sand, 50 pounds of fireclay, and 6 per cent water.

Approximately 65 members and guests were present at the meeting at which R. G. McElwee, Vanadium Corp. of America, Detroit, presided as technical chairman. Also featuring the program was a motion picture illustrating operations at the New Jersey Silica Sand Co., Millville, N. J. Operations, according to H. J. Williams of the firm, cover the preparation of more than 40 different grades of washed sand. —*B. K. Price.*

Detroit

ILLNESS of Marchall Post, vice president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., prevented his appearance at the March meeting of the Detroit chapter of the American Foundrymen's association at the Fort Shelby hotel, March 17, where he was scheduled to speak on "Castings by the Randupson Process." In his absence Harry W. Dietert, president, Harry W. Dietert Co., Detroit, presented one of his interesting discussions of foundry sands and their control.

Following the regular dinner, the new American League moving picture for 1938, "Batter Up," was shown through courtesy of the Fisher Body Corp.

Mr. Dietert showed lantern slides of various types of defects which develop in sand cores and molds and pointed out the underlying reasons for the appearance of such rat tails, scabs and the like. He reviewed the expansion and contraction phenomena of various sand mixtures and explained how additions of sea coal and clay tended to reduce the extent of such changes.

He concluded his remarks with a demonstration of a special type of dilatometer with a large dial indicator which strikingly revealed the extent of expansion and contraction in various samples of molding sand. After placing a sample in the fixture, a furnace was lowered over it and the resulting behavior of the sand was indicated by the pointer on the dial.

The Detroit chapter is sponsoring jointly with Michigan State college its sixth annual foundry conference at East Lansing, April 15 and 16. It will be in the form of a symposium on casting defects, their causes and remedies.

Chicago

LABOR problems were discussed at the monthly meeting of the Chicago chapter of the A.F.A., held at the Medinah club, April 11. Dr. Stewart Scrimshaw, Marquette university, Milwaukee, was the principal speaker. Attendance was more than 150.

Dr. Scrimshaw, who has had varied experience in industrial relations affairs, laid down various premises as a foundation for the solution of labor problems. These he indicated as follows:

1. All groups or types of individuals are the same kind of human beings.

2. We live in a world in which group action is most characteristic of human behavior.

3. Collective bargaining is here to stay.

4. Labor and management have reciprocal rights and duties.

Dr. Scrimshaw pointed out the dangers incident to some phases of labor organization, stating that through inferior leadership labor frequently has become subject to coercion and loss of independence. At the same time management in some instances has lost the good will its employes had held for it prior to union dominance. In this connection the speaker urged that the same skill and energy be applied to the subject of labor relations as has been employed in the development of products and processes.

Dr. Scrimshaw urged employers to stand up for their rights, pointing out that they were entitled to talk to their men regarding labor subjects. Expressing the belief that collective bargaining in industry will continue, he indicated that the urgent need is for mutual responsibility in the actions of both empoyer and employe and that this could be more easily brought about when labor decides to discipline its ranks.

As an added feature of the meeting a sound motion picture entitled "Heat and Its Control" was presented through the courtesy of Johns-Manville. The picture depicted modern methods of controlling heat in industrial operations through adequate insulation.—*William G. Gude, secretary.*

Kansas City

MEMBERS of the St. Louis chapter of the A.F.A. visited Kansas City, March 25 to co-operate with Kansas City foundrymen in an effort to form a regular foundry group. Of the 130 foundrymen present at the dinner at the President hotel, Kansas City, Mo., 27 were from St. Louis, others from other parts of Missouri, Kansas, Oklahoma, and Iowa.

The Kansas City committee in charge of arrangement was as follows: R. O. Flanders, Blue Valley Foundry Co., chairman, Frank Blakeslee, Security Stove Co. and A. O. Nilles, Griffin Wheel Co. The committee co-operated with a committee of the St. Louis chapter headed by Louis Desparois, Pickands, Mather & Co.

First introduction was that of G. S. Haley, chairman of the St. Louis chapter, who then introduced J. O. Klein, vice chairman, and J. W. Kelin, secretary and treasurer of the chapter. D. M. Avey, secretary-treasurer of the A.F.A., Chicago, outlined the plans and purposes and the co-operative educational features of the A.F.A. He described the plan for creating a Kansas City division of the St. Louis chapter. This plan had been considered previously by the executive committee of the St. Louis chapter. The plan was to have a Kansas City group existing as a component yet separate section of the St. Louis chapter. The same officers would supervise the plans and programs of the group in collaboration with a Kansas City committee. This line of activity would be continued until such time as it seemed expedient to create a separate and distinct Kansas City organization.

J. S. Vanick, metallurgist, International Nickel Co., spoke on "Alloy Cast Iron and Points of Cupola Practice" which he illustrated with slides showing graphite formations, structure of iron and unusual castings of alloy iron such as automotive camshafts. Second technical talk was given by Walter Siegerist, Medart Co., St. Louis, on "Application of Foundry Cost System." Mr. Siegerist credited C. R. Culling for original work in the paper which was presented. This cost paper divided the discussion into four general departments of foundry activity, namely, molding, melting, core department, cleaning and shipping departments. A question and answer period brought forth much interesting discussion.—*J. W. Kelin.*

Syracuse

Meeting of the informal group of Syracuse foundrymen was held April 13 at the chamber of commerce, Syracuse, N. Y. The meeting followed a dinner which was attended by 55 men. The subject for discussion was "Casting Defects." Leader of the meeting discussed various methods by which a scrap reduction program can be carried out. Samples of defective castings

(*Continued on page* 106)

Pennsylvania Glass Sand Corporation

LEWISTOWN, PENNSYLVANIA

PRESENTS A NEW SAND

SUITABLE FOR THE FOUNDRY INDUSTRY

For further information, see us at Booth 33-A at the American Foundrymen's Convention, Cleveland, May 14-19.

PGS CORP.

SALES OFFICE
VANDERGRIFT BUILDING
PITTSBURGH, PENNSYLVANIA

(*Continued from page* 104)

were submitted and considerable discussion centered about these castings. Next meeting will be held June 14, the speaker for which has not been chosen as yet.—*Harold H. Judson.*

Reading

READING Foundrymen's association held its regular meeting at the Wyomissing club, Reading, Pa., March 15, with 25 foundrymen from the district at the meeting. Speaker for the evening was G. S. Evans, metallurgist, Mathieson Alkali Works Inc., New York, who gave an interesting talk on "Refining Cast Iron."

H. Lloyd Hess, Lancaster Malleable Casting Co., Lancaster, Pa., attended the meeting as the guest of C. M. Meminger, Lancaster Iron Works Inc., Lancaster. Mr. Hess said he was much impressed with the enthusiasm shown by members at the meeting and the fine spirit of co-operation existing between the foundrymen in the organization.—*H. C. Cummings, secretary.*

Philadelphia

PRESIDENT'S night was celebrated by the Metropolitan Philadelphia chapter of the A. F. A. on Friday evening, April 8 at the Engineer's club. Eighty-five were present at the dinner and about 25 more at the technical meeting that followed. Chairman Harold Henszey conducted the meeting. Report of the nominating committee was read by Dr. G. H. Clamer, chairman. The following nominees were presented: Chairman, Harold Henszey; vice chairman, W. C. Hartman; secretary-treasurer, William B. Coleman; board of directors, L. W. Harris and J. H. Spencer; advisory board, A. W. Bowman and C. H. Schley.

National President, Hyman Bornstein was highly pleased with the work of the Philadelphia chapter and complimented the group in an increase in membership of over 30 per cent in a year's time. He paid tribute to Mr. Spencer, chairman of the membership committee, and complimented Chairman Henszey and his band of co-workers for the showing made in such a short time.

Mr. Bornstein's subject was "Alloy and Heat Treated Cast Iron." He outlined briefly the methods of manufacture and described effects of the common elements found in plain cast iron. Each of the principal alloying elements, such as nickel, chromium, copper, vanadium, tungsten, etc. was considered in connection with its effect in varying quantities on the properties of cast iron. It was pointed out that the engineer and the foundryman had a wide range of selection today, just as in alloy steels, and the use of combinations of alloys was discussed.

Rapid development of high strength irons was discussed and methods used to secure these high strengths, as well as the types of heat treatments and their effect on physical properties, were brought out in a most convincing manner with slides showing charts and micrographs.—*J. T. Fegley, chairman, publicity committee.*

Buffalo

BUFFALO chapter of the American Foundrymen's association held its regular monthly meeting at King Arthur's restaurant, Buffalo, April 4, with 106 members and guests present. Theodore H. D. Burke, Otis Elevator Co. and chairman of the chapter, presided.

W. F. Piper, Beardsley & Piper Co., Chicago, showed films taken by himself on a recent trip around the world. The films, which were very clear and in color, had to do with the custom and daily life in the countries visited.

A director's meeting followed the regular meeting with Mr. Burke in charge. Reports were accepted from various committees including the nominating committee. R. K. Glass, Republic Steel Co. and treasurer of the chapter, gave a financial report and an auditing committee was chosen.—*J. R. Wark, secretary.*

Northern Illinois

MEMBERS of the Northern Illinois Foundrymen's association at the regular meeting held March 8 at the Hotel Faust, Rockford, Ill., voted to affiliate with the A. F. A. as a chapter. Fred Rundquist, Greenlee Bros. & Co., chairman of the committee appointed to study the question of affiliation, made a complete report of the factors involved and A. W. Gregg, Whiting Corp., and Dan M. Avey, secretary-treasurer of the A. F. A. cited benefits to be derived from affiliation. C. M. Dale presided at the meeting.

A questionnaire composed of 24 questions on cupola practice which had been filled out by ten gray iron foundries in the territory was used to make a composite copy for study by the members and for reference by the speaker, Donald J. Reese, foundry engineer, International Nickel Co., Bayonne, N. J.

Mr. Reese limited his talk on "Cupola Practice" to gray iron castings from $\frac{3}{8}$-inch section up. He said that a cupola is operated during its lifetime from 5000 to 10,000 times, melting from 25,000 to 50,000 tons. Saying that a cupola should be analyzed as a fuel burning unit, Mr. Reese went on to discuss coke sizes and carbon control.

Two types of blowers now in use were discussed. The speaker said that 20 per cent and sometimes more of the air delivered by the blower is lost through blast gates, cast iron breast frames and cupola wind boxes. The best pressure for cupola operation was given as 16 to 20 ounces. Mr. Reese covered weights of charges, design of the cupola and the doubtful practice of running small cupolas with the tap hole open.—*John T. Clausen, technical secretary.*

Regular meeting of the Northern Illinois group was held at the Hotel Freeport, Freeport, Ill., April 12. Principal speaker of the meeting was Frank E. Wartgow, American Steel Foundries, who gave an interesting talk on "Foundry Time Study." Mr. Wartgow pointed out the importance of a careful and just rate setting and gave the qualifications that a time study engineer should have. Some interesting charts were shown and the different elements of time study explained.

R. E. Kennedy, technical secretary of the A. F. A., Chicago, gave a short talk about the affiliation of the local group with the A. F. A. He also spoke about the coming A. F. A. convention in Cleveland.—*L. O. Perry, technical secretary.*

New Jersey

NEW JERSEY Foundrymen's association held its regular monthly meeting at the Downtown club, Newark, N. J., March 23. Approximately 110 foundrymen attended. President William P. Laytham presided and W. H. Winters, vice president, American Brake Shoe & Foundry Co. acted as technical chairman.

R. H. Watson, metallurgical engineer, National Steel Co., spoke on "Production of High Grade Gray Iron Castings." Mr. Watson described the effect of variations in the nature and quality of pig iron and coke on casting quality. He emphasized that quality of pig iron could not be determined by chemical analysis alone, since it is affected seriously by rate at which the blast furnace is operated. Character of ores used also makes a vast difference in the quality of the pig iron. Mr. Watson emphasized the importance of using *sized* coke in the cupola and said that the carbon pick up varies between different brands of coke.

The speaker described the melting practice of several automobile, and other foundries. He gave mixtures used, coke ratio, coke size, blast, and other practices and resulting carbon content and physical and chemical

(*Continued on page* 109)

BARTLETT-SNOW

SAND HANDLING—SAND RECONDITIONING AND ACCESSORY FOUNDRY EQUIPMENT

★

LOOK US UP IN CLEVELAND BOOTHS D-9-1, 2, 3, 4

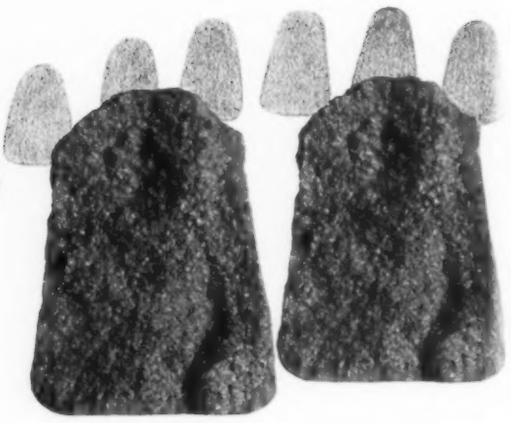
★

MAY 14 TO 19 1938

★

- AERATORS
- APRON CONVEYORS
- BELT CONVEYORS
- CASTINGS COOLERS
- CORE OVENS
- DUST COLLECTORS
- ELEVATORS
- FEEDERS
- FLASK FILLERS
- FLIGHT CONVEYORS
- FOUNDRYMAN'S GATES
- MOLD CONVEYORS
- MOLDERS HOPPERS
- PUG MILLS
- RECIPROCATING CONVEYORS
- SAND DRYERS
- SCREENS
- SHAKEOUTS
- SWING HAMMER PULVERIZERS
- TEMPERING BINS
- WEIGH LARRIES

16 GRADES provide wide choice of characteristics



● Beneficial results from the use of 15% to 20% of SUPERIOR Pure Charcoal Pig Iron in the mix are not confined to grey iron castings.

The 16 grades of SUPERIOR Charcoal Pig Iron offer a wide variety of characteristics which are most important when consistent uniformity and definite results are desired.

On account of the narrow spread in Silicon in each grade, which is indicated by the grading shown at the right, and a Manganese range available to fit all classes of work, Charcoal Pig Iron has been found to be very effective in improving all classes of high strength iron, in controlling depth and hardness of chills, as well as imparting highest qualities to malleable iron.

Charcoal Pig Iron is the oldest and purest of all pig irons. Its quality has stood the test of time. Only the purest of fuels—CHARCOAL—is used in the smelting process and the smelting is done by slow and careful methods under low blast temperatures. The uniformity of its physical structure is unmatched by any other pig irons. Its exceptional strength, toughness, and close-grained structure persists through the cupola. Any one of the 16 grades can be relied upon to give consistent results heat after heat. They are the best insurance a foundryman can have in the production of castings sold on a guaranteed physical property basis.

For genuine dependability use one of the 16 distinctive grades of SUPERIOR Charcoal Pig Iron.

Without obligation, our Metallurgical Department will gladly recommend a grade to fit your needs.

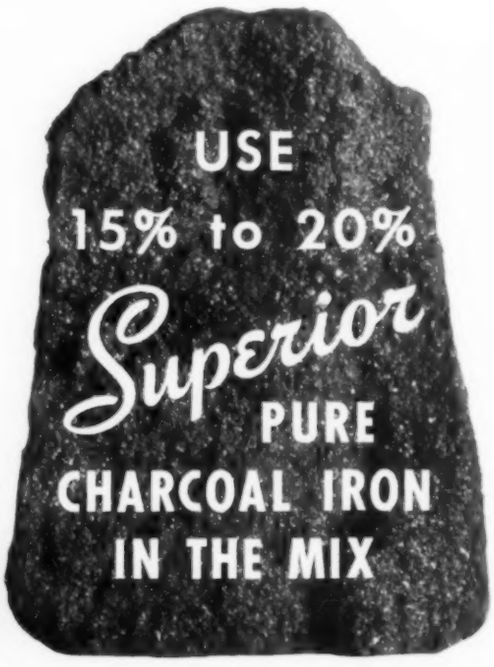
SUPERIOR CHARCOAL PIG IRON
Grading and Analysis

Grade	Silicon			Chill
	Min.	Avg.	Max.	
AAA Sch	2.88	and	over	
AA Sch	2.63	2.75	2.87	
A Sch	2.38	2.50	2.62	
B Sch	2.13	2.25	2.37	
C Sch	1.88	2.00	2.12	
Low 1	1.63	1.75	1.87	
High 1	1.38	1.50	1.62	
Low 2	1.13	1.25	1.37	
High 2	.88	1.00	1.12	
Low 3	.63	.75	.87	Trace to ¼ in.
High 3	.50	.56	.62	¼ to ⅝ in.
Low 4	.38	.44	.50	⅝ to 1 in.
High 4	.25	.32	.38	1 to 1½ in.
Low 5	.20	.25	.30	Low Mottled
High 5	.10	.18	.25	White Mottled
No. 6	.00	.06	.12	White

Phosphorus . . . . . .12 to .17
Manganese. . . . . .30 to .60—.60 to .80—.80 to 1.00
Sulphur . . . . . Trace to .025

SPECIAL IRONS

Special High Phosphorus . . . . . .40 to .70



SUPERIOR CHARCOAL IRON CO.
GRAND RAPIDS, MICHIGAN

(*Continued from page* 106)

properties. He also described methods used to produce the Ford cast crank shaft. An active discussion followed the talk.

Members then viewed a motion picture of operations at the plant of the New Jersey Silica Sand Co., Millville, N. J. The movie showed the various washing, screening and grading processes used in the preparation of various sands and clays. —*John L. Carter, secretary.*

Northeastern Ohio

NORTHEASTERN Ohio chapter had one of the largest regular meetings since its formation when approximately 200 members and guests were present at its April 14 meeting held at the Cleveland club. Bert G. Parker, chairman, presided and following the dinner introduced C. E. Hoyt and R. E. Kennedy, executive vice president and technical secretary, respectively, of the A.F.A. Mr. Hoyt spoke briefly on the coming May convention to be held in Cleveland, and stated that he expected that it would be one of the greatest ever staged. He also complimented the Northeastern Ohio chapter for the hearty co-operation and activities of its various committees working to make the Cleveland convention an outstanding success.

R. E. Kennedy discussed the technical program to be presented at the convention and said that he could not recall one in which so many interesting papers were available for discussion. He also pointed out that much valuable information would be presented at the numerous shop practice courses to be held during the week. J. H. Tressler, secretary of the Northeastern Ohio chapter said that 34 new members had been obtained during the year, and the membership roster now stands at 223.

Frank G. Steinebach, chairman of the nominating committee reported the following nominations of officers for the ensuing year: Chairman, L. P. Robinson, Werner G. Smith Co.; vice chairman, Charles Seelbach, Forest City Foundries Co.; secretary, J. H. Tressler, Hickman, Williams & Co.; treasurer, R. F. Lincoln, Osborn Mfg. Co.; directors for three year term, B. G. Parker, Youngstown Foundry & Machine Co., Youngstown, O., Marcel Reymann, Atlantic Foundry Co., Akron, O., and S. P. Schloss, Superior Foundry Co., Cleveland; director to fill unexpired term of Walton Woody, Fred A. Stewart, National Malleable & Steel Casting Co., Cleveland. Election of officers will be held at the next meeting on May 26.

L. P. Robinson, Werner G. Smith Co., then presented an extremely interesting coffee talk on his experiences as an operator of a modern poultry farm in Michigan. His constant references to parallels between poultry raising and foundry operation were extremely entertaining. Following Mr. Robinson's talk, various convention committees held meetings under direction of the chairmen.—*Edwin Bremer.*

N.J. Nonferrous

A SYMPOSIUM on aluminum foundry practice, sponsored jointly by the nonferrous division of the New Jersey Foundrymen's association and the Metropolitan Brass Founders' association was held April 14 at the Essex house, Newark, N. J. More than 60 foundrymen from New York and New Jersey attended. T. H. Williams, president of the New Jersey group presided, and W. E. Paulson, president of the Metropolitan group spoke briefly in behalf of his organization.

P. M. Budge, chief metallurgist, Aluminum Co. of America, Fairfield, Conn., opened the discussion with a talk on "Aluminum Casting Defects —Causes and Cures." Following that, brief comments and supplementary discussions were presented by H. G. Lamker, foundry superintendent, Wright Aeronautical Corp., Paterson, N. J.; W. G. Reichert, Singer Mfg. Co., Elizabethport, N. J.; Dr. N. E. Woldman, Eclipse Aviation Corp., East Orange, N. J.; R. W. Waring, Sperry Gyroscope Co., New York, and W. E. Day, Mack Mfg. Co.

Mr. Budge described the daily defective analysis form used in his foundry, and explained causes and cures of each type of defect. He laid particular stress on various factors desired for producing high quality castings. Temperature should be kept as low as possible, and control equipment should be capable of preventing undue temperature rises. Multiple gates are preferable, and they should be choked to avoid agitation. Risers are necessary, and several often are required. Skimming should be done three times—at the furnace, on transfer ladles, and just before pouring.

Molds for aluminum must be rammed softer than for iron. Dirt and dust is harmful, and the molds should be blown out thoroughly. At times it is advisable to spray cores or chills with kerosene or fuel oil. Scrap should be remelted, cast into ingots and analyzed to insure definite knowledge of composition. Gates and risers thrown into the pot may oxidize and spoil the metal. Iron pots should be scraped daily and recoated. Hand ladles should be preheated before use.

H. G. Lamker stated that surface pinholes sometimes could be overcome by dusting cores with boric acid. Surface gas holes form a problem which, as yet, has not been solved satisfactorily, but his experiments indicate that turbulence is an important factor. W. G. Reichert said that the commonest cause of shrinkage or porosity is a too high melting or pouring temperature, and he emphasized importance of having risers large enough, and of controlling metal flow by choking or through use of strainer or timing cores. Dr. Woldman stated that many rejections were due to improper interpretation of defects by inspectors. The foundry should check actual testing, and insist on proof that castings really are unfit for use. He said that pinhole porosity in a silicon-copper-magnesium alloy had been eliminated by removing the 0.5 per cent magnesium which it was supposed to contain. Many leakers had been salvaged by impregnating with water glass and baking at 250 degrees Fahr. for 1½ hours. Dr. Woldman also recommended that all castings not heat treated should be aged for 48 hours before machining.

R. W. Waring spoke of anodizing to prevent corrosion, and said that some times it caused dimensional changes such as reduced hole sizes. He favors a stress relieving treatment at 450 degrees Fahr. for 4 or 5 hours. Mr. Waring also stressed the importance of keeping accurate records of foundry practice and results. W. E. Day discussed the bothersome problem of surface porosity, and said that with a large radiator side frame the difficulty had been overcome by employing an unusually open sand with a permeability of 60 to 70, a strong bond, and moisture 2 to 3 per cent. After a lively discussion the meeting adjourned.—*John L. Carter.*

Dinner Is Held for Castings' Buyers

Over 400 members and guests attended the first annual technical dinner and entertainment arranged by the gray iron foundries of Southern California, and held at the Ambassador hotel, Los Angeles, on March 18. The purpose of the dinner was to promote use of gray cast iron and to show the tremendous advancement made in the gray iron foundry industry within the past few years.

Guests were buyers of gray iron and their specification authorities, and included individuals of private industry as well as those public officials responsible for writing gray iron specifications. Among those present were engineering and purchasing officials of the Southern

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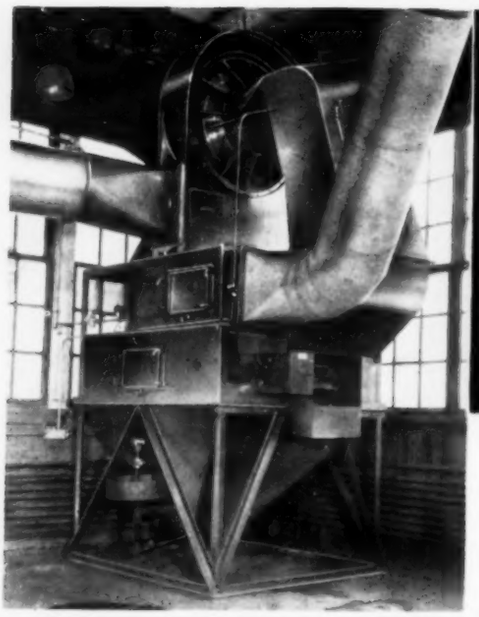

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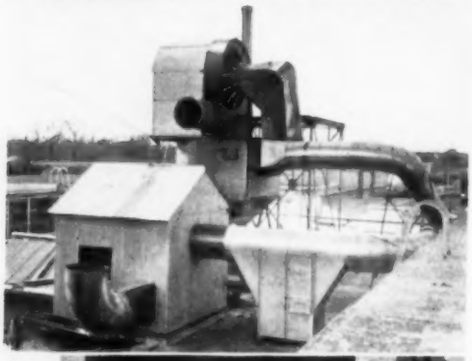
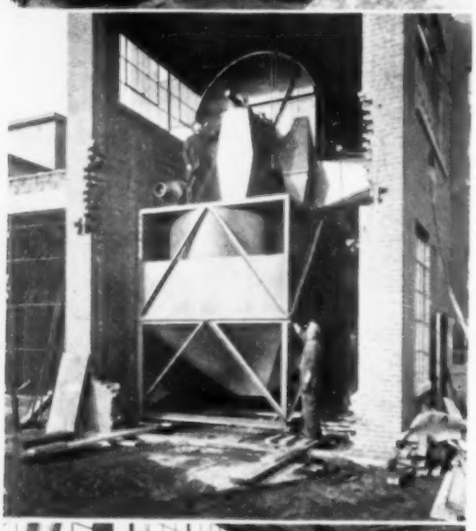
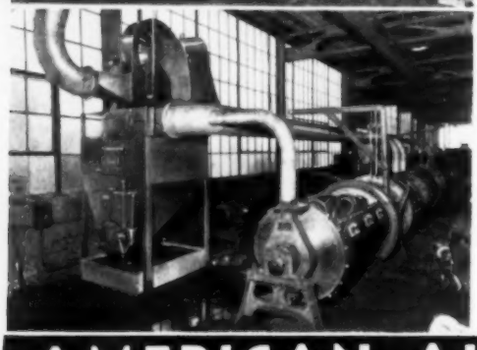
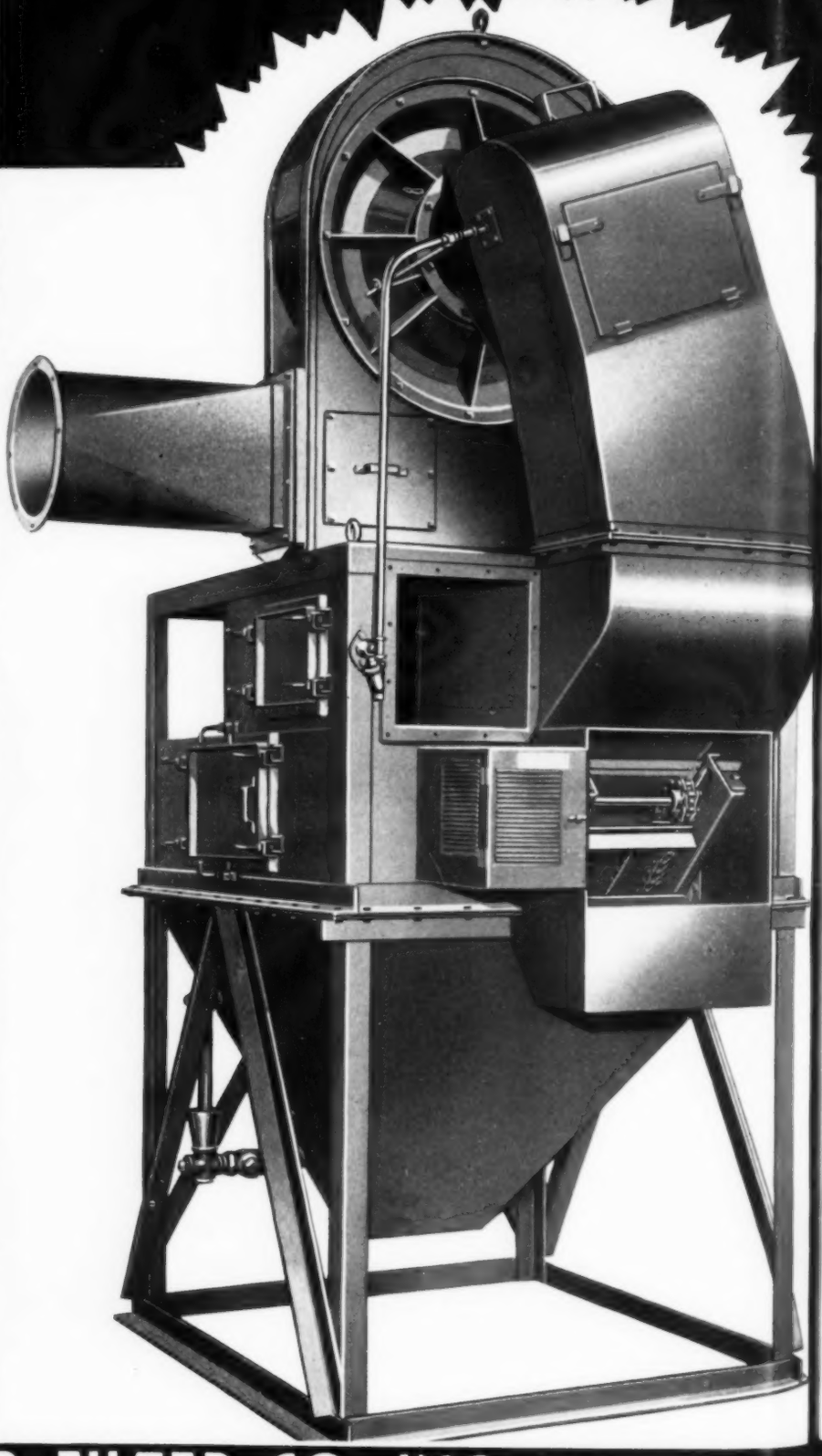


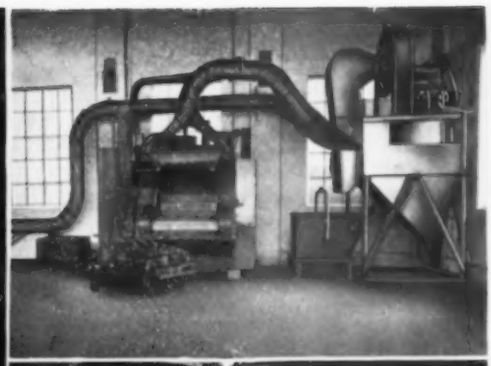


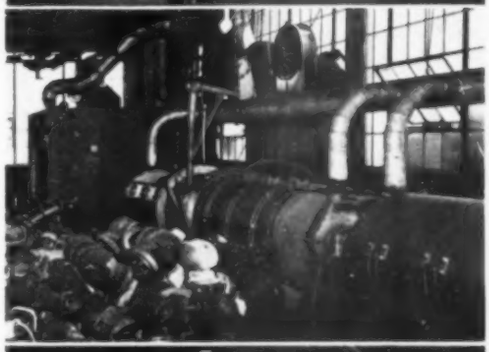


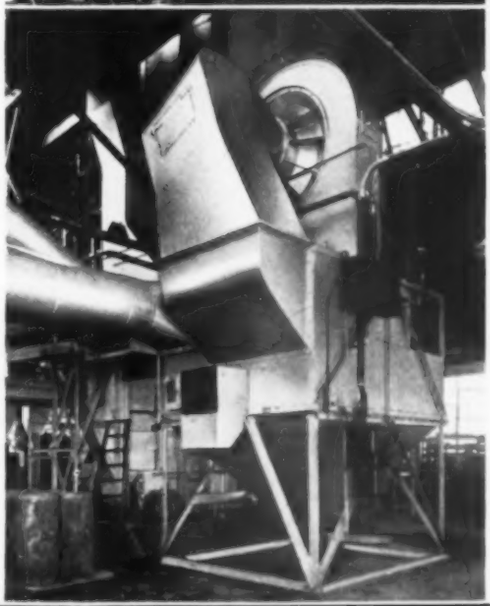


AMERICAN AIR FILTER CO., INC., INCORPORATE

O-CLONE in peration at the A.F.A. Show







AN UNUSUAL opportunity awaits you to see the Type W ROTO-CLONE in actual operation at the A. F. A. show in Cleveland. In addition to the installation in our own space, Booths 187-188, Roto-Clones will be on display, collecting dust under normal operating conditions, in the booths of several foundry equipment manufacturers—the locations of which will be given you when you call at the American Air Filter Display.

ROTO-CLONE offers complete dust control for all foundry operations including shakeouts, sand handling, screens, mullers, tumbling mills, sand blast, grinders, etc. Its design requires minimum floor space and does away with the necessity for fans, pumps, tanks and other auxiliary equipment that require attention and take up additional floor space.

Complete engineering data can be secured at Booths 187 and 188 at the A. F. A. Show—or send for Bulletin Number 274.

TYPE W

ROTO-CLONE

WATER SPRAY DYNAMIC PRECIPITATOR

For Foundry Dust Control

116 CENTRAL AVE., LOUISVILLE, KENTUCKY

(*Concluded from page* 109)

California municipalities, public utility companies, oil companies, Metropolitan Water district, department of water and power, State of California, Los Angeles county and city harbor department, and state highway department.

C. E. Hopping, Alhambra Foundry Co. and chairman of the meeting, spoke briefly before introducing the guest speakers. He stated that this event marked the first effort of the gray iron foundries of Southern California to conduct an educational program for the many gray iron buyers in that area. Mr. Hopping pointed out that the gray iron foundries in the locality represented an industry collectively valued in excess of $10,000,000, employing several thousand men, and purchasing millions of dollars worth of equipment and materials.

Guest speakers include V. A. Crosby, metallurgical engineer, Climax Molybdenum Co., Detroit, who spoke on "Modern Cast Iron"; P. E. McKinney, metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa., who discussed "Making and Machining High Test Cast Iron," and Fred J. Walls, metallurgical engineer, International Nickel Co. Inc., Detroit, who talked on "Progress in Foundry Practices and Engineering Properties of Alloy Irons." An elaborate and attractive floor show concluded the evening's entertainment.

Those responsible for arranging the highly successful program included: C. E. Hopping, Alhambra Foundry Co. Ltd., general chairman; Walter Madsen, Madsen Iron Works, chairman invitation and publicity committee; H. S. Hitchcox, Apex Steel Corp., chairman entertainment and reception committee; Robert Gregg, Reliance Regulator Co., chairman speakers' committee, and Earl Grover, Apex Steel Corp., chairman finance committee.

Gray iron foundries which cooperated in the arrangements included: Ace Foundry Ltd.. American Foundry, Apex Steel Corp., Commercial Iron Works, Hopping's Foundry, Kinney Iron Works, Pacific Castings Co., Madsen Iron Works, Reliable Iron Foundry Inc., United Casting Co., Alhambra Foundry Co. Ltd., Axelson Mfg. Co., Dayton & Waldrip Co., Enterprise Foundry Corp., Johnson Foundry & Machine Works, Long Beach Iron Works, Mechanical Foundries Inc., Quality Foundry & Mfg. Co., Reliance Regulator Corp., and Westlectric Castings Inc.

The entire program not only was an overwhelming success from the standpoint of education and entertainment, but also it has planted in the minds of the casting buyers of southern California, the fact that the foundrymen of that area form a fundamental part of the community's business life, and they have a fine group of products to offer. Plans are being made to make the technical dinner and entertainment an annual event.—*M. S. Robb, chairman publicity committee.*

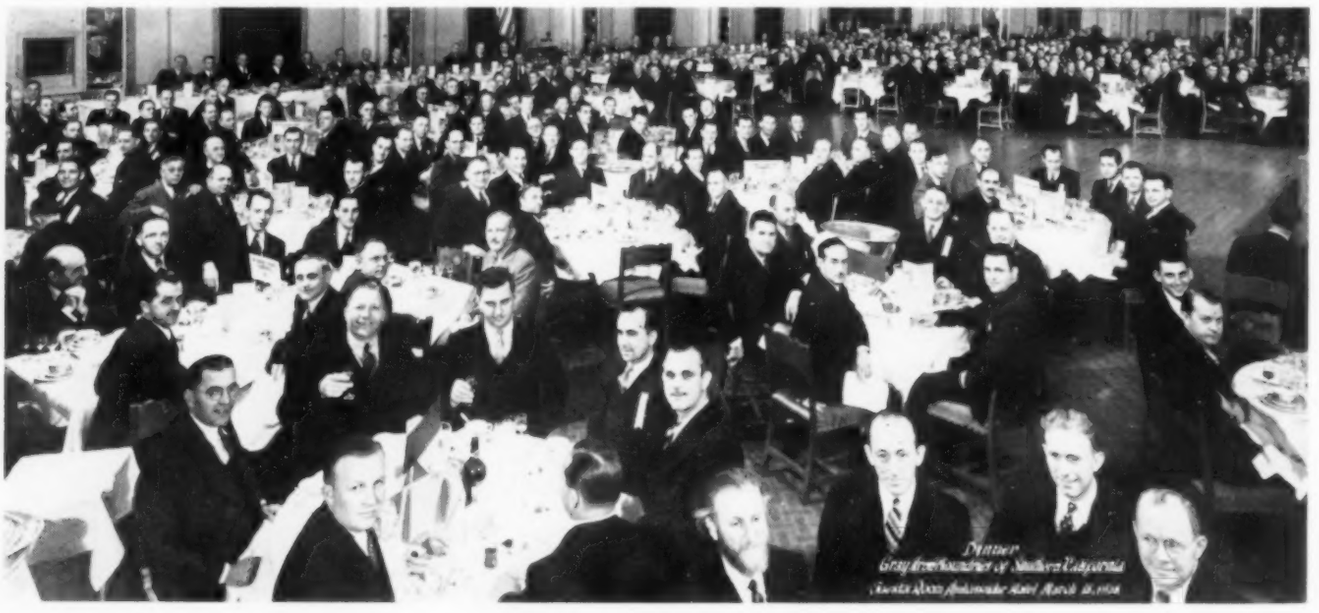
Book Review

A.S.T.M. Proceedings, 1937, Parts I and II, covering a total of 2072 pages in two volumes, published by the American Society for Testing Materials, 260 Broad street, Philadelphia, and supplied by THE FOUNDRY, Cleveland, for $6 each in cloth; and $7 each in half-leather, and in Europe by the Penton Publishing Co. Ltd., London.

These volumes of the 1937 proceedings are published in two parts. Part I comprises committee reports and the new and revised A.S.T.M. tentative standards. Part II gives all technical papers presented at the New York meeting, including the Edgar Marburg lecture by T. Smith Taylor. Reports from 45 standing committees are included in the 1365 pages of Part I. This volume also includes tentative specifications and test methods with a section of extensive reports on steel, wrought iron, nonferrous metals, masonry materials, etc.

Other reports in Part I cover the society's work on corrosion of iron and steel, malleable iron castings, fatigue of metals, copper and copper alloys, cement, petroleum products, paint, soaps, and methods of testing. Part II is composed of 55 technical papers in addition to the twelfth Marburg lecture on "Some Applications and Methods of Testing." Six papers comprise the symposium on the significance of tests of coal, and there are a number of papers on the general subject of metals. Other pertinent subjects such as the relation of properties of cast iron to thickness of castings, analysis of the brinell hardness test, interpretation of creep test data, and measuring elastic drift receive their share of attention in this particularly valuable book.

E. I. du Pont de Nemours & Co. Wilmington, Del., has announced the formation of an electroplating chemicals division, designed to correlate the various manufacturing departments of the company contributing to the plating industry. The division will be headed by J. C. Pickard, formerly West Coast manager, R. & H. Chemicals department, Pacific division.



Dinner held by gray iron foundries of Southern California was well attended

TWO SIMPLE CHANGES

Made This Foundry *"Semi-Continuous"*

WHEN rapid expansion forced enlargement of foundry facilities, a prominent manufacturer modernized the existing plant into a semi-continuous project, in two logical steps.

Tilting Spout Cupola. First, he fitted the cupola bottom with a tilting spout, permitting the filling of ladles at each side—first one and then the other—without interrupting the flow.

Ladles Handled on Trucks. Second, he installed Elwell-Parker Lift Trucks to take ladles carrying 3500 pounds of hot iron to molding floor—50 to 300 feet distant—and to bring empty ones back for refilling. Trucks are kept moving steadily—practically no waiting at either end.

Other Jobs for Same Trucks. Between heats, the same Elwell-Parkers transport castings in skid boxes to cleaning room; sand and scrap in dump hopper skids. Always busy—*at owner's profit.*

Benefits: Hotter, more easily-handled metal; flexibility of volume (up to 250 tons per day); and maximum speed and safety.

Elwell-Parker Engineers are ready to help you apply these same cost-reducing principles to the transporting of your own loads. Present customers will be interested in recent developments and applications.

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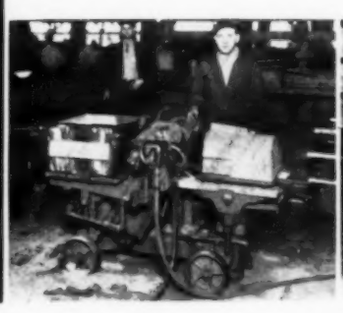

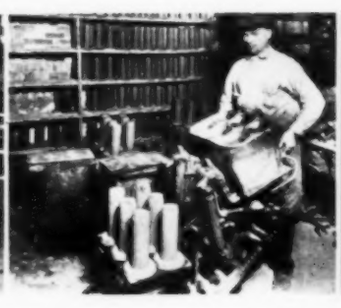

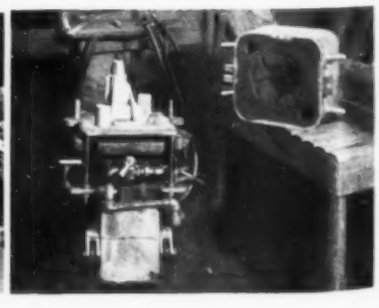

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65 Standard Types for Castings

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Blowers of 5 different designs

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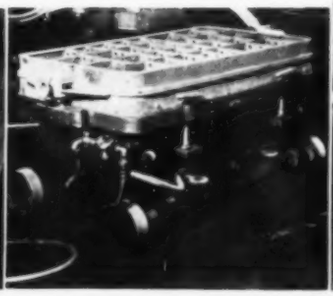


New England Foundrymen Hold Regional Conference

AN EXCELLENT technical program, coupled with an attendance of 362, featured the second New England foundry conference held under the joint sponsorship of the New England Foundrymen's association, the American Foundrymen's association, and the Massachusetts Institute of Technology on April 8 and 9. All technical meetings, luncheons and the annual dinner were held in the beautiful building of M.I.T.

The conference was arranged by the following committee members: Chairman, R. F. Harrington, Hunt-Spiller Mfg. Corp., South Boston; vice chairman, D. L. Parker, General Electric Co., Lynn, Mass.; Leroy M. Sherwin, Brown & Sharpe Mfg. Co., Providence, R. I.; Henry S. Washburn, Plainville Casting Co., Plainville, Conn.; George F. Hutchins II, Standard Foundry Co., Worcester; Prof. J. M. Lessells, M.I.T.; P. E. Kyle, M.I.T.; and Joseph Judge, Jenkins Bros., Bridgeport, Conn. The registration and reception committee was headed by R. H. Rehm, Whitehead Brothers Co., Providence, R. I., as chairman, and T. C. Wilson, Republic Steel Corp., Boston, as treasurer.

Foundrymen Are Welcomed

The first session on Friday morning was opened by R. F. Harrington, chairman of the committee. J. M. Lessells, associate professor of mechanical engineering, Massachusetts Institute of Technology, welcomed the visiting foundrymen to the campus of the institute.

The second session, which was dedicated as a memorial to the late Luman S. Brown, for many years president of the Springfield Facing Co., Springfield, Mass., was devoted to good housekeeping in the foundry. E. H. Ballard, General Electric Co., Lynn, Mass., presided. An interesting and instructive paper on "The Application of Dust Control Principles to Foundry Operations" was presented by Ralph R. Meigs, assistant chief engineer, Liberty Mutual Insurance Co., Boston. Mr. Meigs stressed the importance of taking care of the so-called little things in the development of any successful good housekeeping program in the foundry.

The speaker pointed out that molding and coremaking operations are relatively dust free. The major problem in connection with these departments is to prevent the contamination of areas where molding and coremaking operations are carried on by dust entering from adjoining areas or released by miscellaneous processes. In other words, it is necessary to protect molders and coremakers from dust which they do not themselves create. Shakeout operations usually are dusty. Dust control measures depend largely upon the type of foundry involved and local shop conditions. Careful consideration should be given to the possibility of carrying on shakeout operations with a minimum number of persons working in the vicinity. Effective respiratory protection should be worn by persons so engaged during dusty periods, according to Mr. Meigs.

R. F. Harrington
Chairman, Conference Committee

Henry A. Jensen
President, New England Foundrymen's Association

Need for directing more attention to the development of better shakeout procedures which will eliminate practices producing unnecessary dust, was stressed by the speaker. Exhaust ventilation should be installed in connection with any centralized shakeout station or stationary shakeout units. Mr. Meigs stated that sand handling or conditioning equipment involving dry sand should be provided with adequate dust ventilation at all points where there is an agitation or disturbance of the dry material.

Maintained in Good Condition

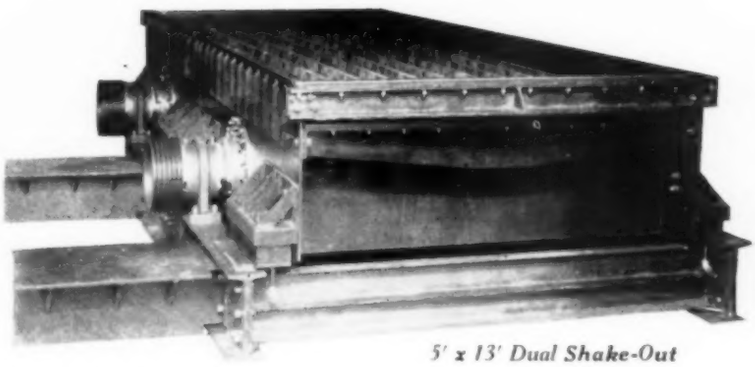
Mr. Meigs stated that mechanical castings cleaning equipment is, in general, provided with adequate dust control provisions which can be kept in effective working order by proper maintenance. Manual cleaning operations, although they often present more difficult problems, usually are not of sufficient importance to warrant corrective consideration. Written discussion was presented by Manfred Bowditch, director, division of occupational hygiene, department of labor and industries, Commonwealth of Massachusetts, Boston, and by Warren F. Terry, engineer of dust suppression, West Somerville, Mass.

Mr. Bowditch stressed the need for confining sweeping and cleaning operations to outside of regular working hours. He stated that in a recent foundry study made by the division, the products of the sweeping operations were found to account for more than one-third of the airborne dust in a given period. To those foundries contemplating the re-circulation of cleaned air, the speaker called attention to a simple method of providing an automatic warning for failure of filters.

Mr. Terry confined his discussion of the subject to control through prevention and education. He stated that careless practices should be abolished and that the general practice among employes of using compressed air for cleaning clothing should be prohibited as it creates

(*Continued on page* 120)

Simplicity Foundry Equipment



5' x 13' Dual Shake-Out

Simplicity Shake-outs are in operation today in practically every production foundry and in many jobbing foundries throughout the United States and Canada. Installations range from one up to forty Simplicity units in each shop, with repeat orders continuing to testify as to their satisfactory service. Baked dry sand moulds weighing up to forty tons are shaken out on Simplicity machines in two minutes time. Dual type units, as illustrated, are ideal for handling those heavy flasks, and can be readily used in connection with a dust control system.

It is now recognized that properly prepared sand is vital to securing good castings with a minimum loss. The shop desiring such prepared sand can use a Simplicity Sand Screen in their system. Where no system is available, the 2' x 3' Portable Screening and Conditioning Unit is being used with very great success to handle heap sand and the discharge from mullers. Where a greater capacity is desired, the 3' x 6' Semi-portable Unit illustrated here has no equal in the work it will do. This unit is moved around the shop with a crane and fed with a clam shell. In both the 2' x 3' and 3' x 6' Simplicity units, the sand is screened through a fine mesh screen cloth, the lumps broken up by the breaker, the scrap and impurities removed, and the sand thoroughly conditioned, with the moisture evenly blended by the action of the screen and by the blades of the sand throwing unit, as they cut through the stream of sand and throw it out in a fluffy condition ready for the moulders. Users of these units report obtaining the finest sand ever secured with a low operation cost.

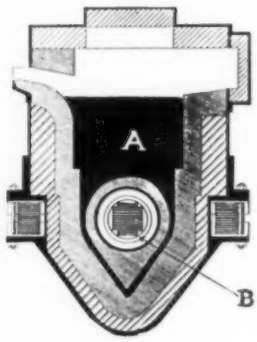
See the Simplicity machines in operation at the Cleveland Foundry Show, Space E 4-7 and 8 on Aisle 8, Lower Level, Cleveland Auditorium. Our Engineers will gladly check your problem.

2' x 3' Portable Screening and Aerating Unit

Simplicity Engineering Company

DURAND, MICHIGAN

For Canada: Waterous Limited, Brantford, Ontario



Approaching the Ideal

Melting in which the metal to be melted is the hottest part of the furnace, is an outstanding feature of the Ajax-Wyatt furnace.

Many other features contribute to economical operation and ideal working conditions.

It is, therefore, not surprising that Ajax-Wyatt equipment purchases have continued during the recession.

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AJAX ELECTRIC FURNACE CORPORATION

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IN THIS SWIFT AGE SAVE YOURSELF METALLURGICAL TIME AND WORRY!

You haven't time to experiment with this or that mixture; neither does it pay you to attempt to mix your own metals.

We are experts in the manufacture of Non-Ferrous Ingot Metals—backed by fifty eight years' experience; and we gladly offer Ajax Service, therefore, which means expert advice on your foundry problems and in the selection of a formula best suited for the purpose intended.

Ajax 7 Point Ingot Metals are as pure and fine as the most modern scientific knowledge and equipment can produce; and their regular use in your foundry will insure a maximum number of perfect castings at the lowest possible cost.

A. F. A. CONVENTION
Cleveland, May 14th to 19th

All foundrymen are cordially invited to visit our Exhibition Spaces Nos. 75, 76 and 77, Upper Level, Exhibition Hall

AJAX 7 POINT INGOTS

THE AJAX METAL COMPANY

Established 1880
PHILADELPHIA
NEW YORK—CHICAGO—CLEVELAND

(*Continued from page* 116)

considerable dust and is an unsafe practice. Wetting or oiling foundry floors and gangways will prevent general dispersion of dust caused by movements of workmen or equipment. Education of the employe on dust suppression lines will make him a safer workman in controlling the dust problem.

The afternoon technical session featured a paper "Controlled Directional Solidification as Related to the Design of Castings," by C. W. Briggs, physical metallurgist, U. S. Naval Research laboratory, Washington. N. L. Mochel, Westinghouse Electric & Mfg. Co., Philadelphia, presided.

In discussing the mechanization of freezing, Mr. Briggs stated that freezing progresses from the face to the center of the casting. By establishing temperature gradients in the casting, he pointed out that it is possible to produce directional solidification proceeding from progressive solidification. Temperature gradients may be controlled by the size of the casting and by the gating or heading. The manipulator has control of freezing in directional solidification but has no control over the sequence in progressive solidification.

Resort to Chills

While it is proper to feed a smaller section through a heavier one, Mr. Briggs pointed out that at times this is not possible and it is necessary to resort to chills. Application of directional solidification requires the mold and core to be as collapsible as possible. The rate of skin formation is governed by two factors, namely the absorption of heat by the walls during first cooling, and the subsequent transfer of heat through the walls of the mold. The speaker stated that an increase in surface area does not increase the rate of solidification. Care must be given to junction feedings. He stated that junctions may be classified as *L*, *T*, *V*, *Y*, and *X*. Mr. Briggs showed through slides the solution of problems in these sections by changes in design and the application of chills.

Mention was made of the value of models in the development of technique of gating and risering. Also radiographic examinations are important. The speaker expressed the opinion that the designing engineer should make the section thickness as nearly uniform as possible. The foundrymen then can introduce padding and other means to provide controlled directional solidification. In the lower temperature alloys, temperature gradients in the mold are not great, but it still is possible to establish temperature gradients in the metal through methods of gating after considering all factors.

P. E. Kyle, department of mechanical engineering, Massachusetts Institute of Technology, then presented a most interesting demonstration on crystallization. A small amount of a substance was heated between two slides, placed in a lantern and allowed to cool, with the result that the formation of crystals was demonstrated excellently. Mr. Kyle also showed the effect of several shapes of molds on structural formation and then illustrated the solidification of a material having two crystals of different types, when solidified.

Discussed Teaching Efforts

Mr. Harrington presided at the dinner held in Walker Memorial of M.I.T. on Friday evening. Dr. Vannevar Bush, vice president and dean of engineering, M.I.T. presented an interesting discussion of the teaching efforts and the experimental and development work of the institute especially in connection with the subject of materials. He pointed out that only an organization of that type has the facilities to undertake some of the projects now being studied. Dr. Bush also welcomed foundrymen to M.I.T. and explained that through such meetings, the faculty is better able to prepare students to enter industry.

Henry S. Washburn, Plainville Casting Co., Plainville, Conn., and the nominee for vice president of the American Foundrymen's association, spoke in place of Marshall Post, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa., and present vice president of the association, who was unable to attend because of illness. Mr. Washburn presented greetings from the association officers and outlined some of the work carried on by the A.F.A. Short talks also were made by Henry A. Jensen, General Electric Co., Lynn, Mass., and president of the New England Foundrymen's association, and by Dr. George B. Waterhouse, M.I.T. and president American Society of Mechanical Engineers.

In opening the technical session Saturday morning, W. G. Reichert, Singer Mfg. Co., Elizabethport, N. J., and chairman of the session, pointed out the numerous and valuable early contributions of New England foundrymen in the work on sand control. These included the work of R. F. Harrington, W. M. Saunders Sr., and many others.

Harry W. Dietert, president, Harry W. Dietert Co., Detroit, presented a talk on "Sand Control in the Foundry" and gave an interesting demonstration of sand testing methods and equipment. Mr. Dietert pointed out that foundrymen should be interested in the action of sand at both high and low temperatures. Molding sand consists of sand grains, water and clay. By the proper control of all three items, Mr. Dietert stated that the desired results can be obtained in the foundry. Hardness, permeability and flexibility of the mold must be controlled completely.

In determining the composition of the sand, the first control is for moisture, the second for grain fineness and the third for clay, where the percentage, green strength and dry strength are determined. In Mr. Dietert's opinion, moisture control machines belong in the foundry so that quick tests can be made constantly.

Both fineness and distribution of sand grains must be controlled. The speaker stated that if 60 to 75 per cent of the sand is retained on several adjacent sieves, the sand has been compounded well. On the other hand if the amount retained on adjacent sieves is low, the sand will present difficulties. The more sand grains retained on adjacent sieves, the better will be the permeability efficiency.

Keep in Condition

Mr. Dietert emphasized the need for keeping sand testing equipment in good condition and stated that permeability equipment should be checked occasionally by the stop watch method. The testing demonstration covered both room and high temperature work on steel and iron molding sand as well as core sand. The high temperature demonstration proved unusually interesting for those present. In one case Mr. Dietert showed the sintering properties of a sand sample. A high temperature furnace also was operated to duplicate conditions which the sand encounters in the mold. With this unit it was possible to produce buckles and scabs on the sand specimen, thus demonstrating what actually happens in the mold when metals at high temperature come in contact with the sand.

D. L. Parker, General Electric Co., Lynn, Mass., and chairman of Subcommittee 6B-7 of the steel division of the American Foundrymen's association, presented a progress report of a study of compression strength, rate of breakdown and expansion-contraction properties of steel foundry sands at temperatures from atmospheric to 3000 degrees Fahr. The research is being conducted at Cornell university under the direction of Dr. Heinrich Ries of the department of geology.

Mr. Parker stated that to date the greater part of the research has been occupied in calibrating the various instruments being used, exploring the heating zone of the

(*Concluded on Page* 122)

New! ROTOPLANE SPEED SIFTER

New
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SIEVE

A New Type Sand Riddle . . . Mechanism Entirely Sealed-in . . . Greater Capacity — Longer Life

Here it is! The new ROTOPLANE Speed Sifter . . . New in every way. A sand Riddle with an efficient, rotary sifting movement and all mechanism *completely* enclosed. No bearings or activating parts *of any kind* are exposed to dust and grit. Ventilated motor is entirely sealed in—no oil dripping, no relubrication. Lubrication is guaranteed for the life of the motor.

Overall height 62 inches, weight approximately 90 lbs. The design makes it easily handled and carried by one man. The one-piece frame is made of a strong, tough aluminum alloy, and the rigid frame makes possible a very effective vibration.

Activating weights swing free and cannot pound ball bearings, greatly increasing bearing life. One size and type of riddle serves all foundry purposes . . . does *all* your sifting more quickly and economically.

The new ROTOPLANE Speed Sifter employs both of the amazing new riddle features recently introduced by us . . . the All-Steel Bottom, and the Quick-Change Sieve. Sieves are mounted in strong steel ferrule and clamp quickly onto the split-ring bottom. Instantly interchangeable. All sieves have 20-inch diameter *clear* sifting area. No more wooden rims, no jagged screen edges to tear workers' hands; no storage problem, no waste space. You can "stack your sieves like playing cards."

Price $175.00 f.o.b. Chicago

Complete with cable, plug, grounded safety wire, and new type sieve (mesh Nos. 2 to 4). Standard ½ h.p. motor, 115 or 230 volt 60 cycle single phase. Other motors quoted on request.

Ten Days Free Trial

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FOUNDRY SUPPLIES MANUFACTURING CO.

2221 Orchard St. Chicago, Ill.

Sold by Progressive Foundry Supply Companies

(*Concluded from page* 120)

furnace and running test specimens to check the procedures as set up by the committee members. This work has been completed and the actual tests now are being made. Tests thus far run indicate to the committee that accurate check results can be obtained. Curves which have been plotted on tests made, showing strength and deformation against time, indicate that the initial sand tested breaks down at the end of 30 minutes at a temperature of 900 degrees Cent. This breakdown of strength holds steady for another 15 minutes and then starts back to pick up until at the end of 60 minutes it is stronger than at any previous time. The committee feels that an explanation of this property will be obtained when the tests have been completed and the structural differences of the sand determined, together with the effect of other base materials.

Discuss Various Subjects

The luncheon meeting on Saturday noon was devoted to a discussion of "Training of Foundry Engineers in Technical Schools." Short talks were made by Prof. J. M. Lessells of M.I.T.; Frederick G. Sefing, International Nickel Co., Bayonne, N. J.; Harold H. Judson, Goulds Pumps Inc., Seneca Falls, N. Y.; C. O. Butler, Warren Pipe Co., Everett, Mass.; Prof. Alexander, Northeastern university, Boston; and Prof. Edgar MacNaughton, Tufts college, Boston.

The period immediately following the luncheon was devoted to the answering of questions raised by the discussion and demonstration at the morning session. W. G. Reichert, Singer Mfg. Co., Elizabethport, N. J., then presented an interesting paper entitled "Casting Defects." Mr. Reichert stated that the solution of the problem requires management to maintain certain fundamental policies. For example, steps must be taken quickly to investigate and classify the causes of all defective castings. Then action should be taken immediately to correct the causes. A record should be kept of all casting defects. Many foundries have standardized their gating arrangements and have made card index files of the types of gate for certain classes of jobs. Job responsibility, test data and casting defect data must be centralized and correlated.

The speaker discussed internal shrinkage and stated that the difficulty arises in pressure castings where the design is not correct. In general, shrinkage of the internal type can be corrected by proper gating, proper risering, proper chills and by the composition of the metal which will narrow down the solidification range. However, one cannot use the same methods at all times to accomplish the purpose.

Close co-operation between the designer and the foundry is essential, according to Mr. Reichert. In his opinion, a drawing should be submitted to the foundryman before the production of patterns is undertaken. The best design for a casting is one that presents the least risk in manufacturing.

Mr. Reichert discussed risers and internal and external chills. The tendency to chill may be caused by an improper mixture, pouring metal into the mold at an improper temperature, or in the case of piston rings, the humidity in the atmosphere. This difficulty may be corrected by the addition of ferrosilicon, graphite, or methods of feeding. Segregation usually is present in those castings showing a tendency toward internal shrinkage. To prevent entrained slag, it is necessary to choke the metal somewhere in the gating system. However, the real solution is to melt hot iron so the slag particles free themselves from the metal and can be removed.

Mr. Dietert then presented a number of slides in which were illustrated castings defects due to sand. Considerable discussion followed the presentation of each side.

Henry A. Jensen, General Electric Co., Lynn, Mass., discussed several problems of gating, and showed a number of sectioned castings to illustrate his discussion.

Foundry equipment and supply representatives of the district held a foundrymen's smoker and dinner at the Hotel Lenox, Saturday evening, April 9, for those attending the conference. An exceptional entertainment program featured the party. The committee was composed of Ray Hunter, chairman; T. C. Wilson, treasurer; Frank Kumer; R. H. Rehm; Harry Impey; Herbert Klein; Hugh Johnston and Joseph Cooney.

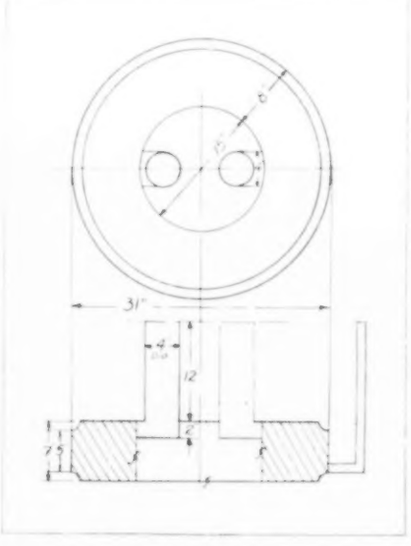
Reader's Comment

EDITOR'S NOTE—*Material Appearing Under this Head Does Not Necessarily Reflect the Opinion of The Foundry or of Its Editors.*

Different Lines

To the Editors:

With reference to the question and answer, "Shrink Holes Spoil Heavy Cast Ring," which appeared in the April issue of THE FOUNDRY on page 38, it is very true that the type of risers shown are more of a hindrance than a help in feeding this casting properly. It seems to be a problem at times to convince individuals that a riser to feed correctly must be such as to maintain the metal in a fluid state as long as the casting requires feeding. It would be far better to reverse the shape of the riser, having it taper to a small area at the top of the cope and wider at the casting, which brings the large body of metal close to the casting, gaining the desired result, namely a solid casting. This method still leaves an unsightly spot that has to be chipped and ground.



Place two side risers in center

Our experience has been along somewhat different lines. We strive in all cases, wherever possible to gate our castings at the bottom. Instead of placing the risers as the diagram illustrates, directly on top of the casting, we would suggest inserting the risers at the parting line and on the inner circle using either square or round riser heads, with a runner about 2 inches high and 4 inches wide. This is similar to a gate and riser, but greatly enlarged. This produces a clean casting where no machining is done. The riser height of 12 inches seems to be correct in maintaining a pressure sufficient to insure a solid casting, but an 8-inch cope would serve just as well.

We do not believe in pouring iron at a low temperature but at about 2600 degrees Fahr. Castings weighing as much as 4000 pounds and 30 x 50 and 12 inches thick have been made with excellent results.

FRANK L. WALDENMEYER,
Metallurgist
A. J. Lindemann & Hoverson Co.
Milwaukee

P. M. FOUNDRY SERVICE

• In the interests of good castings Pickands Mather & Co. supplies Meltrite Pig Iron and Foundry Coke—and furthermore, offers the services of trained metallurgists, with practical foundry experience, to advise and consult on your foundry problems. This service is available without obligation.

WHILE attending the Foundry Show this year stop in and see us.

The Pickands Mather & Co. exhibit contains many interesting features. It will be worth your while to see it.

We'll be glad to greet you.

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CLEVELAND • CHICAGO • DETROIT • ERIE • TOLEDO • MINNEAPOLIS • DULUTH • ST. LOUIS

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REFRACTORY FOR JOINTLESS LININGS

Shipped DRY—Made Plastic By Adding Water

For Cupola, Ladles, Crucibles,
Slag Holes, Well, Breasts

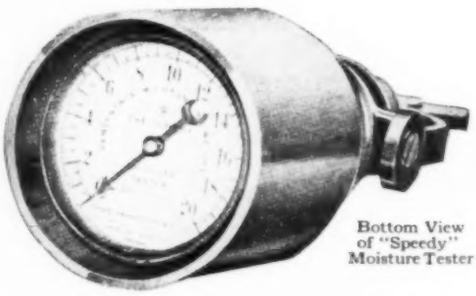
Thinner and Cleaner Linings — Lower Conductivity — Longer Life — Insures Against Run Out

ASK THE FOUNDRYMAN WHO USES IT

LIQUITOL

This heat holding scientifically prepared powder retards cooling, permits the metal to flow into every pipe and porosity, to eliminate all cavities and sponginess, to reduce risers and runners. Will not injure nor effect the physical or analytical properties of the casting in any way, does not interfere with intermittent feeding.

CHECK . . . *and be Sure of the Moisture Content in every batch of material*



Bottom View of "Speedy" Moisture Tester

"SPEEDY" Moisture Tester

THE "SPEEDY" MOISTURE TESTER

Determines and accurately indicates "on the dial" the exact percentage of moisture in YOUR FOUNDRY or MOLDING SAND.

EVERY FOUNDRY SHOULD HAVE ONE

Contained in one carrying case weighing only 13 pounds. Is so simple to operate anyone can make moisture tests accurately and rapidly—No more guessing. Check—"on the dial" and be sure of the moisture content of your batches and materials.

Complete "Speedy" Moisture Testing Outfit with Carrier

Write for information—See how easy it is to operate.

THE ALPHA LUX CO., INC.

192 FRONT STREET NEW YORK

European Foundry Practice

Digest of Recent Literature Covering Various Phases of Castings Manufacture

Feeding Castings

Feeding Aluminum Alloy Castings, by R. Perret, *Foundry Trade Journal,* London, England, Aug. 12, 1937.

Castings of aluminum alloys frequently exhibit such defects as blowholes and films of oxidized metal, and the author of this article discusses the causes of such defects and methods of overcoming them. The blowholes he discusses are not the result of wet sand, hard ramming, tight cores, etc., but rather are those which he attributes to improper feeding. It is pointed out that the average molder tends to employ a downgate of large cross-section with an enlarged conical shape at the top which is easy to make.

It is difficult to keep such a gate filled, and air is drawn into the casting with the molten metal. That type of gate also promotes gyratory action of the metal stream causing breaking of the oxide film. The author suggests use of an oval shape downgate with a variable slope which should not be too large in cross-section. He mentions pouring from a 600-pound (brass) capacity crucible with a rate of flow from 1.6 to 1.8 pounds per second not to be exceeded. Also that it is possible to produce perfect castings with rather small downgate cross-section (14 millimeters, about 0.6-inch, diameter for castings requiring with their feeding heads, 6.3 pounds of metal) without having to pour very hot.

He also mentions that the oval shape downgate has a cross-section more like that of the stream from the crucible, making it easier to receive the full stream during pouring. With larger castings use of pouring basins with or without stoppers, is recommended. In the pouring basins the author also suggests employment of a variable cross-section to eliminate turbulence. Fall of metal in the downgate should be limited to 16 inches approximately; if greater, the angle between the downgate and entrance gate must be greater than 90 degrees.

To reduce velocity of metal entering the mold it is advisable to use wide ingates, that is to say to make the ingates of definitely larger cross section than the downgate. The ratio of the cross sections may vary from 2 to 5 according to the castings. For example, for a cylindrical downgate 20 millimeters (0.79 inches) in diameter with a cross-section of 314 square millimeters (0.49 square inches), the ingate cross-section may be from 800 to 1000 square millimeters (1.24 to 1.55 square inches). To insure good distribution of metal and heat in the casting, and also to facilitate gate removal, it is advisable to use wedge gates.

Radiator Molding

A New Molding and Sand Preparing Method, by Mario Olive, *Foundry Trade Journal,* London, England, Aug. 26, 1937.

In this article the author describes an installation in Italy for the production of cast iron, steam and water radiator sections which are molded and poured in the vertical position. The flasks, which are open at one end, have a perforated partition in the center for carrying of gases and steam generated during pouring. Each mold contains two half impressions, one on the front face and the other on the back face, and each impression consists of four cavities for that many radiator sections.

The molding machine has one pattern mounted in a fixed position vertically while the other is mounted on a swinging arm. The flask is placed against the fixed pattern, the movable pattern swung into position, and locked. Then the flask is filled with sand from an overhead hopper, and the sand squeezed through a piston mounted on the back, drawing the movable pattern toward the fixed one.

Since the flasks contain impressions on each face, they are assembled in series or multiple for pouring. Cores are set as the molds are assembled. The flasks as made are placed on a moving platform equipped with guides. The platform conveys the assembled molds to the pouring station, and thence to the shakeout station. Shaking out is accomplished by inverting the mold. Empty flasks are returned to the molding machines on another moving platform in the near vicinity.

The article also includes a description of the sand preparation installation which involves the treatment of the sand in measured batches in stages rather than continuously.

Etching Cast Iron

Primary Etching of Gray Cast Iron (Primaeraetzung von grauem Gusseisen), by H. Jurich, *Die Giesserei,* July 2, 1937.

According to the author there is no suitable, generally applicable etching agent which will work in all cases for the determination of the primary structure of gray cast iron and malleable cast iron. He mentions use of the Baumann sulphur print when sufficient manganese-rich sulphide is present, and states that in gray iron where the sulphur is under 0.10 per cent there is no suitable agent for development of primary structure.

In many cases where a dendritic arrangement of graphite is present, an etching with ammonium persulphate or with dilute sulphuric acid in combination with ammonium persulphate, ammonium molybdate or mercurous chloride gives good results. A favorable effectiveness in indicating primary structure not reached by the former agents is realized with concentrated sulphuric acid and formic acid. The formic acid is broken down into carbon dioxide and water by the sulphuric acid, and the carbon dioxide prevents formation of an oxide skin on the surface of the specimen.

In etching of a specimen with finely divided and more or less dendritically arranged graphite, formic acid does not completely prevent oxidation of the surface. A more effective agent is boric acid which in concentrated sulphuric acid is broken down into boric oxide that combines with the metal oxides. With increasing quantity and size of graphite flakes, boric acid does not entirely prevent oxidation, and it is necessary to remove the oxide skin with a light polishing on a cloth disk. The article includes numerous illustrations to show the effectiveness of formic acid and boric acid in resolving primary structures.

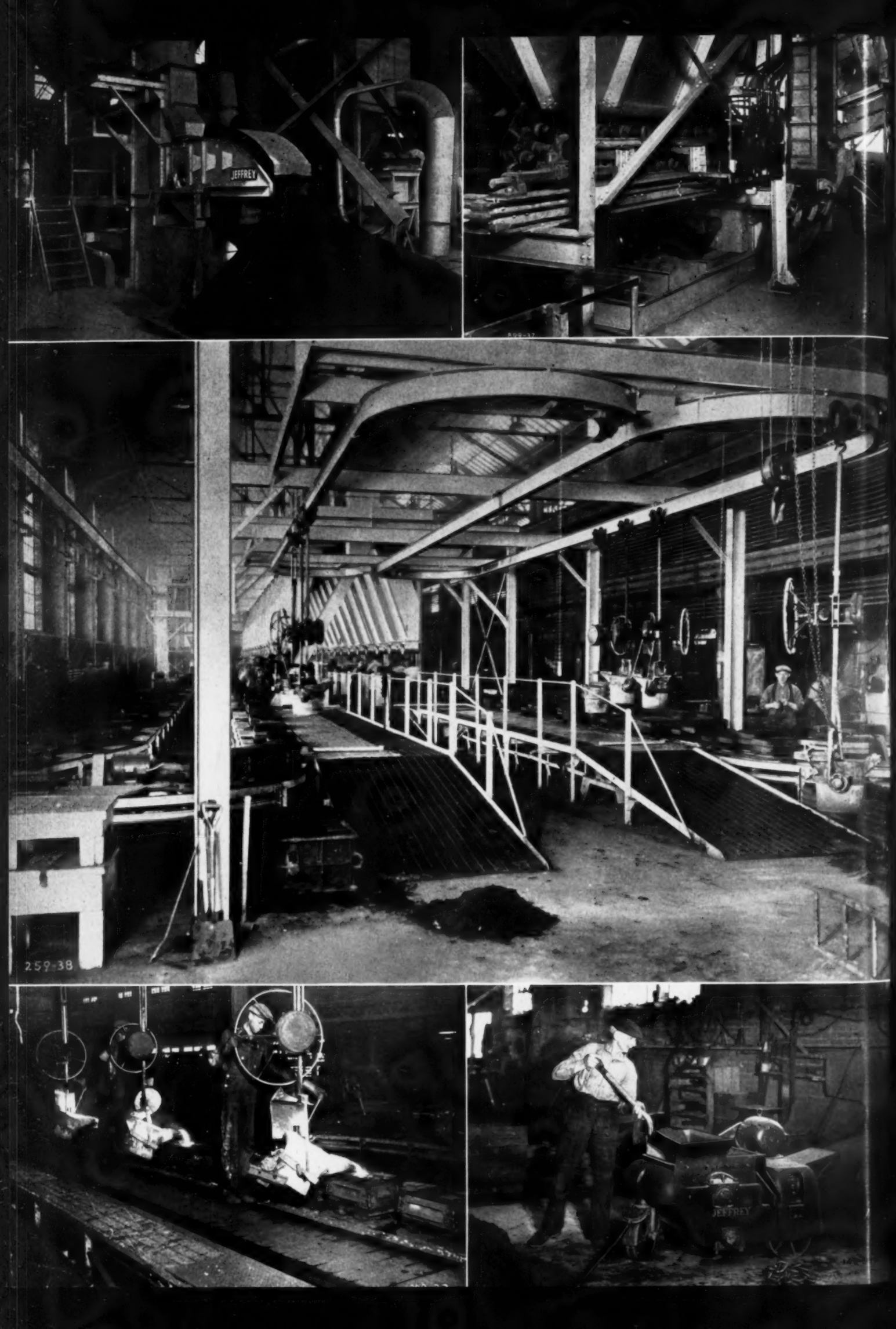

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Fig. 9—Large flat surfaces and surfaces in relief are polished on belt sanding machines

Finishing Aluminum Castings

(*Continued from page* 66)

cutting efficiency and to prevent overheating. For most rough polishing, wheel speeds of 5000 to 8500 surface feet per minute are adequate. In the case of cup wheels and abrasive disks on portable grinders, a grinder speed of 4000 to 5000 revolutions per minute is sufficient. Lubricants such as stick tallow or grease may be used when necessary. These should be used with care to avoid excessive lubricant being driven into the pores of the casting and spotting the surface by seepage during some later finishing operation.

Files find considerable use for final touching up of castings and for cleaning sections that cannot be ground with larger tools. A single deep cut, coarse, curved tooth file will remove metal rapidly without loading of the teeth. Similar files with notched teeth, which break up the cuttings are even more rapid but do not produce as smooth a surface. A tooth pitch of 9 to 12 teeth per inch generally is preferred for these files. For smaller work and finish-filing, long-angle lathe files or hand cut files may be used satisfactorily. Files of this type should be provided with 14 to 20 teeth per inch cut with a side rake of 45 to 55 degrees.

Sand or steel grit blasting offers an excellent method for cleaning aluminum alloy sand castings as well as providing a uniform pleasing appearance to the finished part. Surface discoloration, minor surface roughness, and roughness from coarse grinding operations can be removed readily or masked by sandblasting. Unsoundness which may be present just below the surface is generally revealed by blasting, which makes this procedure desirable in connection with the final inspection of castings.

Must Prevent Warping

Any of the standard blasting equipment will be found suitable for aluminum castings, providing the conditions of operation are chosen to prevent excessive warping. With a suction type blast this is not as important a consideration as with a direct pressure blast. For small light work using direct pressure equipment, ¼ to ⅜-inch nozzles and about 60 pounds per square inch air pressure is generally satisfactory. Nozzles up to ½-inch diameter and pressures up to 90 pounds per square inch with similar equipment, should take care of the heaviest castings. Suction type equipment using 90 pounds per square inch seldom will result in warping. Of course, from the standpoint of cost, it is always desirable to select nozzles and pressure conditions which will provide the desired finish with a minimum of air and abrasive.

There are a number of materials suitable for blast use. A washed silica sand of 40 to 80 mesh is suitable for general use. Coarser material, such as crushed silica rock up to 6 mesh may be desired for certain ornamental finishes but is generally too rought for average cleaning. Finer material down to 200 mesh also may be desired in some cases for ornamental work although again this is not a desirable practice for average work. Steel grit or shot may be substituted for sand if desired, such substitution being required by certain casting users to eliminate the hazard of sand remaining in a casting and later working out into the assembly of

(*Continued on page* 132)

Finishing Procedures for Aluminum Castings

Operation	Polished Finish	Buffed Finish	Satin Finish (Compound)	Satin Finish (Wire Brush)
1	Stitched rag wheel. No. 70 to No. 120 fused aluminum oxide	Stitched rag wheel. No. 70 to No. 120 fused aluminum oxide.	Stitched rag wheel. No. 70 to No. 120 fused aluminum oxide.	Stitched rag wheel. No. 70 to No. 120 fused aluminum oxide.
2	Stitched rag or felt wheel. No. 140 to No. 220 emery.	Stitched rag or felt wheel. No. 140 to No. 220 emery.	Stitched rag or felt wheel. No. 140 to No. 220 emery.	Sandblast—No. 100 to No. 200 silica sand.
3	(Stop at abrasive giving desired surface).	Stitched muslin buff—Tripoli.	Stitched or open muslin wheel—Greaseless polishing compound.	Wire wheel—0.006" diameter wires.
4	.....	Open muslin buff—Lime or soft silica.	.....	.....

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ARCADE SECTION
CLEVELAND PUBLIC AUDITORIUM

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M.S.A. Products include Breathing Apparatus . . . Inhalators . . . Comfo Respirators . . . Masks of all Types . . . Gas Indicators . . . Gas Detectors . . . Safety Goggles . . . Protective Hats and Caps . . . Edison Electric Cap Lamps . . . Safety Belts . . . Safety Clothing . . . First Aid Equipment. Descriptive Bulletins on request.

Allis-Chalmers Shakeout Screens

REMOVE SAND QUICKLY

FLASK shakeout screens are a necessary part of every modern continuous molding and pouring unit. Sand is removed from the flasks quickly and effectively with Allis-Chalmers mechanically vibrated shakeouts. These screens are built of heavy construction to withstand the continuous production and uninterrupted service so necessary with modern production methods. Their mechanisms are of the positive eccentric type imparting the same intensity of vibration to the screens regardless of the amount of load. Each corner of the screen is mounted on a heavy coil spring which not only keeps the screen body balanced with respect to the mechanism but also relieves the bearings of the body load. Allis-Chalmers shakeouts are built in sizes to suit your requirements. Displayed at Foundry Show.

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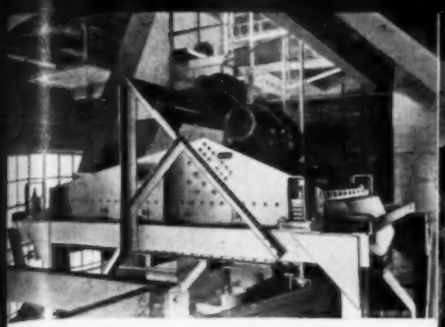
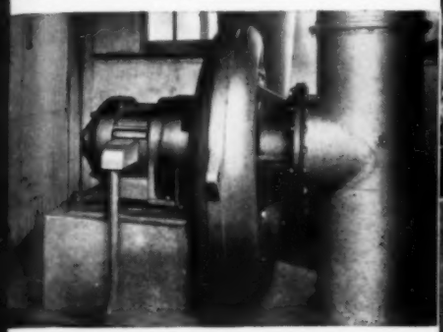
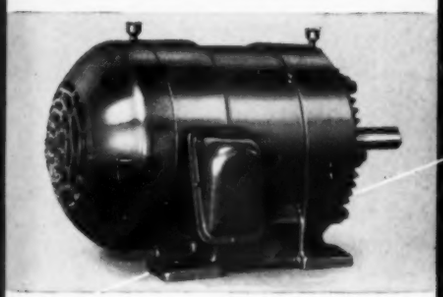
See our exhibit at the Foundry Show



4' x 10' Single Deck Low-Head Vibrating Screen removing lumps and foreign material from sand previous to conditioning.



Overhung Type Foundry Cupola Blower rated 9800 cfm., 1.25 lbs. G., 3550 rpm., with 75 hp. motor. A similar unit will be shown at the Foundry Show.



Allis-Chalmers builds a complete line of a.c. and d.c. motors over 1 hp., and a.c. control, for driving foundry equipment. These are furnished with starting characteristics and mechanical modifications to suit the drive and operating conditions.

See the new Allis-Chalmers Vari-Pitch Speed Changer at the Foundry Show. It establishes a new high in variable speed transmission. Having a ratio of 3¼ to 1, you can obtain a speed range of 1000 rpm. to 3500 rpm. with an 1800 rpm. motor. Standard sizes to 33 hp.

4' x 6' Flask Shakeouts, with dust removal hoods, installed on continuous moulding and pouring unit producing tractor parts

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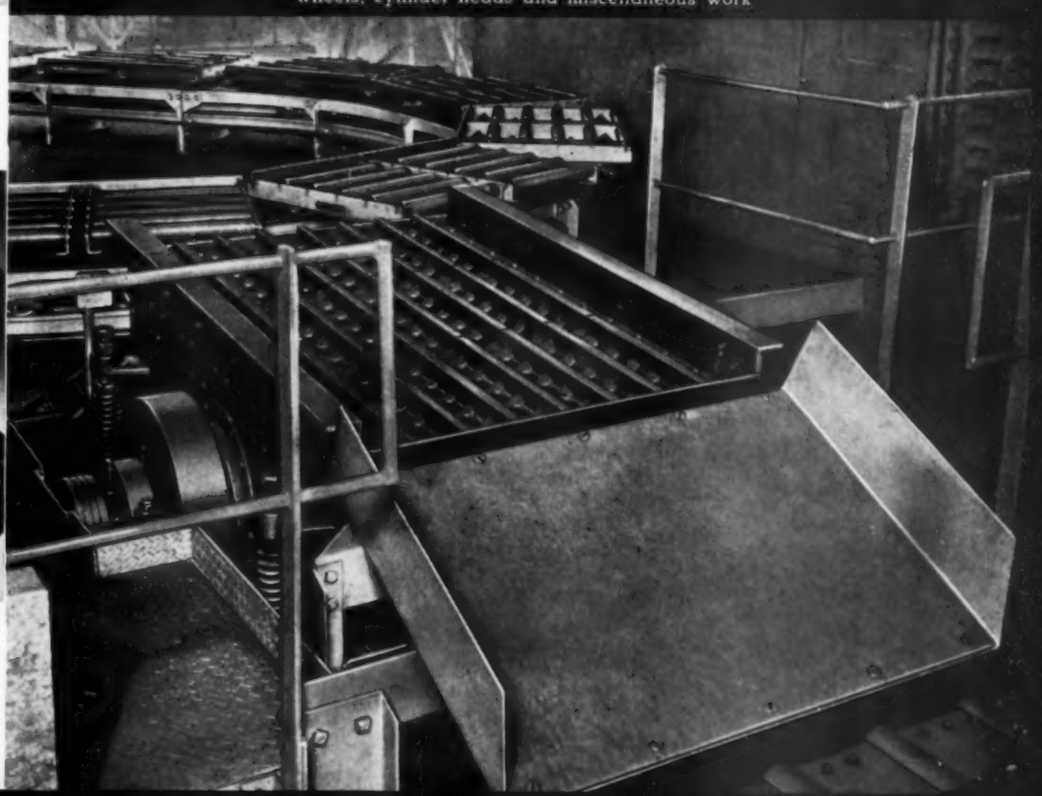
4' x 6' Flask Shakeout Screen on a high production molding and pouring unit making flywheels, cylinder heads and miscellaneous work



(*Continued from page* 128)

which the casting becomes a part. The proper grade of steel grit or shot for any particular job can be selected from the various sizes.

Welding and soldering of aluminum alloy castings are practical procedures providing they are done under carefully controlled conditions. Welding generally is preferred, particularly where maximum strength is desired, and can in most cases be done as readily as soldering. Either oxyacetylene or oxyhydrogen torches or the electric arc, when used with a suitable welding rod and flux, will produce satisfactory welds on the common alloys. Castings preferably should be preheated before welding to minimize danger of cracking and to facilitate the welding operation. They should likewise be cooled slowly to room temperature after welding. Welded areas can be cleaned readily by one of the several methods described previously.

Treat Warped Castings

Castings often may become warped during knock-out or by the natural stresses set up in them during solidification and cooling. With suitable care even the least ductile of the aluminum alloy castings can be straightened within limits. In many cases this can be done cold. In a few cases, particularly in the case of the less ductile alloys and where considerable deformation is required, local heating may be required.

Up to this point, we have discussed only the normal trimming and cleaning procedures required for every casting. Certain castings may require additional finishing to further improve their appearance. Castings for ornamental and architectural applications, for which aluminum is ideally suited, can be supplied with a number of attractive finishes. These finishes are applied by either mechanical, chemical, or electrochemical means. Their successful application depends to some extent on the shape and alloy of the object to be finished, as well as the skill of the operator, making it necessary to work out the most efficient system for each individual part. Only a few of the general practices therefore can be given.

Sandblasting already has been mentioned as a means of applying a pleasing matte finish to aluminum castings. In using this practice for the finishing of large flat castings, and particularly castings which are later given a chemical or electrochemical treatment, somewhat more care must be exercised in blasting than would be required for cleaning alone. Distance from nozzle to work, nozzle angle and size must be kept constant. Motion of the nozzle in blasting should be in parallel lines extending the full length of the work. Uniformity of the surface after blasting may not reflect the necessity for this control but is reflected by many of the subsequent finishes that may be applied.

Polished finishes are likewise among the mechanical finishes used for ornamental applications both as polished or as a base for subsequent chemical or electrochemical finishes. Normally these are applied by using graded abrasives set up on wheels or belts, starting with coarser abrasives first and working down to the fineness desired. The number of steps required will depend on the type of casting and the equipment, and should be worked out for each job. For the rougher work, muslin or canvas wheel sections, glued together to provide a wheel of the desired thickness and set up with emery or fused aluminum oxide abrasives of the proper size, are quite suitable. Similar wheels, or shaped wheels of felt of the required degree of hardness, set up with emery, are used for the finer finishing.

Buffed and satin finishes also are applied readily with suitable wheels after the preliminary polishing. Sewed muslin wheels are suitable for buffing, using abrasive applied to the wheel face in a grease binder. Tripoli grease cake forms a good material for that purpose. Coloring following buffing is done with unsewed muslin or flannel wheels using lime or soft silica mixed with a grease base. For satin finishing, wire wheels composed of nickel, stainless steel or German silver wires of such a size as to give the desired surface texture are sometimes used. Greaseless polishing compounds used with muslin or canvas wheels will also provide a pleasing satin finish. A finish closely approaching a true satin likewise can be obtained on flat surfaces with a belt sanding machine using a cloth belt set up with No. 240 emery.

Wheels for mechanical finishes may vary from about 6 to 20 inches in diameter. Wheel speeds should be such as to minimize heating as well as any tendency to tear the abrasive out of the glue. A peripheral speed of about 6000 feet per minute should be sufficient for the polishing operations. Stick grease or tallow may be used to reduce the danger of burning. For buffing and coloring, wheel speeds of 7000-8000 feet per minute are preferred. Wire wheels should be run relatively slow to avoid excessive tearing of the metal, a peripheral speed of 700-900 feet per minute being sufficient. Belts for polishing work on aluminum alloy castings should be operated at speeds of 2400-3000 feet per minute with a suitable lubricant.

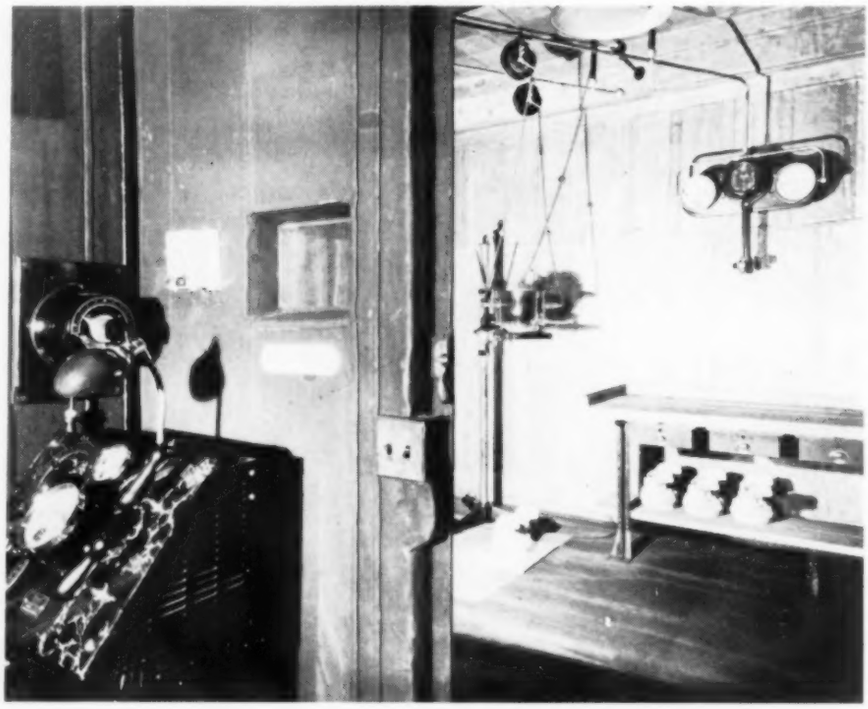


Fig. 10—Typical X-ray laboratory for inspection of aluminum alloy castings

A few general mechanical finishing procedures for aluminum alloy sand castings are shown in the accompanying table. The polishing sequences noted are only typical for average work and may be revised for specific jobs.

Chemical finishes often are used to further enhance appearance of aluminum castings, as well as to improve resistance to corrosion, and adherence of paint. A number of solutions may be used for that pur-

(*Concluded on page* 136)

An Improved MOLDING MACHINE

HEAVY DUTY TYPE 11-F JOLT SQUEEZE MOLDING MACHINE BUILT STATIONARY or PORTABLE

Heavy Duty Type 11F Combination Jolt Squeezer 11½" Squeeze Piston 5¼" Jolt Piston. Weight 1400 lbs.

DESIGN and CONSTRUCTION

Long Cylinders and Pistons.

The long round pistons and parts assure longer life, better alignment and greater rigidity. Guide pins and bushings are hardened and ground.

The bulk of the weight is in the base and lower parts of the machine which is subject to the greatest wear and tear from strain and vibration caused by jolting.

The upright is a double extra heavy tubing with a large margin of safety to withstand at least fifty (50%) percent more strain than it is subjected to. It also serves as an air reservoir at the machine and a water and oil trap.

The air supply is piped in on top of this column therefore eliminating this piping or hose at the floor line.

The cross arm and ram head are made of steel, guaranteed against breakage. The cross arm is equipped with ball bearings so that it will swing easily. The ram head can be adjusted quickly up or down to the proper height of the flask.

Base, Cylinder, Valve pad, bushing support, upright support as well as lugs for riddle holder and mold shelf are cast in one piece.

We recommend jolting and squeezing with our disc valve. It not only makes one valve less but it is a more durable valve and the operator does not have to stand with his knee against the knee pad while the mold is jolting and is free to perform any other operation at the same time. We furnish knee operated jolt valves on request.

Our new oiling system insures lubrication to the jolt and squeeze piston at all times.

This machine will be exhibited at the A. F. A. Convention

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"FERRO CARBO" CUPOLA ADDITION

S THE FOUNDRY INDUSTRY
G REFRACTORY PRODUCTS

IN THE MALLEABLE FOUNDRY The Carborundum Company Recuperator saves fuel in the air furnace by furnishing preheated air for combustion. See illustration No. 3 . . . Carborundum Brand Firesand is used for patching at the metal line of air furnaces . . . "Carbofrax" muffles and "Carboradiant" chambers for Malleable Annealing Furnaces. See illustration No. 1.

IN THE STEEL FOUNDRY "Carbofrax" brick are used for lining dry ports in acid open hearths giving increased port life.

IN THE GRAY IRON FOUNDRY "Ferro Carbo" is used as a cupola addition for a deoxidizing agent resulting in an oxide free iron, with high strength and hardness but still readily machineable . . . "Carbofrax" slag hole blocks eliminate possibility of slag hole failures on continuous pouring operation.

IN THE ALUMINUM FOUNDRY "Carbofrax" brick for melting furnace linings give a metal free from lining inclusions . . . "Carbofrax" tile provide a means for indirect heating to prevent metal oxidation . . . "Carbofrax" brick in fire boxes of coal fired furnaces eliminate clinker adhesion and reduce firebox repairs . . . "Carbofrax" pyrometer protection tubes eliminate possibility of iron contamination.

IN THE NON-FERROUS FOUNDRY

Crucible Furnaces "Carbofrax" shapes for ring linings, crucible rests and lids . . . "Carbofrax" No. 3 and No. 5 cements for ramming and monolithic linings. Illustration No. 2 . . . "Carbofrax" No. 10 cement for patching linings.

Ajax-Wyatt Furnaces "Alfrax" and "Mullfrax" prefired loops give long, trouble-free service.

Detroit Electric Furnaces "Alfrax" and "Mullfrax" shapes for preformed linings . . . "Alfrax" and "Mullfrax" cements for rammed linings.

Open Flame Furnaces "Carbofrax" brick and shapes for preformed linings . . . "Carbofrax" No. 3 and No. 5 cements for rammed linings. Illustration No. 4.

Non-Ferrous Cupolas "Carbofrax" brick and shapes for linings and tuyere blocks.

Ladles "Carbofrax" No. 3 and "Firefrax" No. 2 cements for ladle linings.

REFRACTORY CARBORUNDUM PRODUCTS

THE CARBORUNDUM COMPANY, REFRACTORY DIVISION, PERTH AMBOY, N. J.

(Carborundum, Carbofrax, Alfrax, Mullfrax, Firefrax and Ferro Carbo are registered trade-marks of The Carborundum Company)

(*Concluded from page* 132)
pose although the initial cost of materials, safeness in handling, and ease of control, generally establishes the one most preferable for any particular use. The nature of certain of the chemicals used makes it also desirable to have such solutions prepared by, and used under the direction of, someone familiar with the characteristics of these materials.

Various chemical etches are often employed as a means of improving the surface appearance. A 5 per cent sodium hydroxide solution frequently is employed for this purpose, as is a solution of 5 per cent sodium hydroxide and 4 per cent sodium fluoride, both being used at a temperature of 160 to 180 degrees Fahr. Time of treatment in either solution will depend on both concentration and temperature and must be determined for the finish required. After etching, the castings should be washed thoroughly in clear water and then transferred to a bath of nitric acid to neutralize any sodium hydroxide left on the surface and remove the colored film left from the etch. A satisfactory nitric acid solution is made up by mixing two parts of concentrated nitric acid with one part of water. For castings containing substantial amounts of silicon, the addition of 1 part of hydrofluoric acid to 8 parts of nitric acid promotes better removal of this film. A final rinse in clear water completes the etching procedure.

Use Protective Oxide Coating

Several chemical treatments which provide a protective oxide coating also are available for use with aluminum castings. Such chemical treatments are known under the trade name of Alrok coatings and are suitable for many applications. These coatings provide improved resistance to corrosion and make a good base for subsequent paint coatings. They are less expensive to apply than the electrolytic oxide coatings.

Novelties, interior ornamental parts, and parts requiring surface hardness often find electroplated finishes applicable. Such plated finishes as nickel, copper, zinc, tin, and chromium are readily applied to aluminum alloy castings provided certain simple precautions are observed. Care must also be exercised in the selection of alloy and type of plate to insure the best results with electroplated finishes.

The electrolytic process of oxidation or anodic treatment is finding increasing favor as a method of finishing aluminum alloy castings; the method generally used is known as the Alumilite process. Oxide coatings produced by this process, in addition to their protective value, also possess remarkable abrasion resistance and good dielectric characteristics. Certain types of coatings are very adsorbent and can be impregnated by selected substances, both for color effects and to increase the resistance to corrosion.

It is readily seen that aluminum alloy castings may be finished to provide a great variety of finishes to meet almost any demand. In addition to the individual finishes, combinations of these may be developed greatly expanding the available possibilities. Methods of finishing are rather flexible and these, as well as the operation sequence, may be varied to suit the individual conditions.

Forms Engineering Service Firm

F. T. Spikerman and Earl F. Oyster have formed Oyster & Spikerman, Inc., foundry production engineering service with offices at 17605 Winslow road, Cleveland. They will offer consulting service with reference to foundry production problems, molding machine, sand handling, and conveying equipment and plant layout.

Mr. Oyster was formerly associated with the Osborn Mfg. Co., Cleveland, as chief engineer and more recently with SPO, Inc., Cleveland, as vice president and chief engineer. For the past year, Mr. Oyster has been engaged in private foundry consulting work.

Mr. Spikerman was associated with the Osborn Mfg. Co. in the sales department for many years, with SPO, Inc. as president and in charge of sales. He has recently been engaged in private foundry engineering service.

Company Pays Honor To Its Veterans

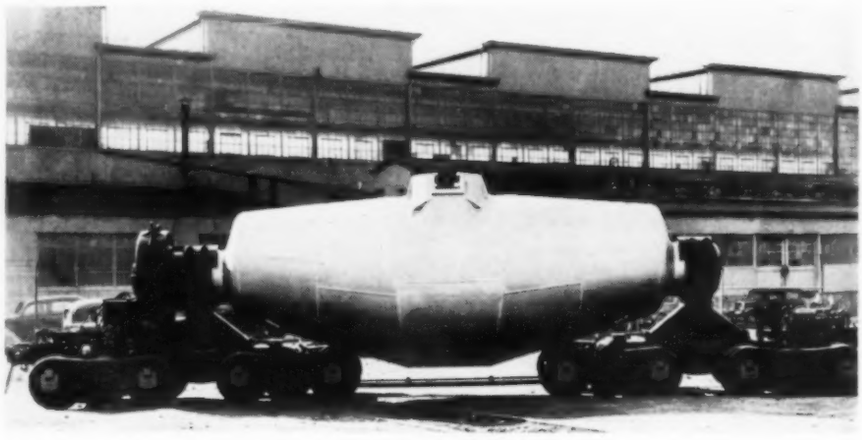
At a banquet recently in the recreation hall of the plant, 88 veteran employes of the Textile Machine Works, Reading, Pa., with service record of 25 years or more were presented gold watches by the founders of the firm, Ferdinand Thun and Henry Janssen. Others present included members of the firm, foremen and all employes with service record of at least 20 years. Among the recipients was Henry Lorah, first employe who started with the partnership of Thun and Janssen in 1892 when they opened a small machine shop. Miss Mabel Balmer was the only woman in the list. Several veterans are employed in the foundry department. According to Dr. John E. Livingood, vice president of the company, 7.2 per cent of the employes have a service record of 20 years or more. He contrasted this figure with 4 per cent, the average for similar groups in American industry.

Adds to Plant

Link-Belt Co., Chicago, manufacturer of elevating, conveying and power transmitting equipment, has enlarged its plant at 1116 Murphy avenue, S. W., Atlanta, Ga. The addition is 20 x 288 feet and is constructed with structural steel framing, steel sash and corrugated metal covering.

Cutler-Hammer Inc., Milwaukee, has moved its Cincinnati office to the American building, Central Parkway and Walnut. M. C. Steffen is manager.

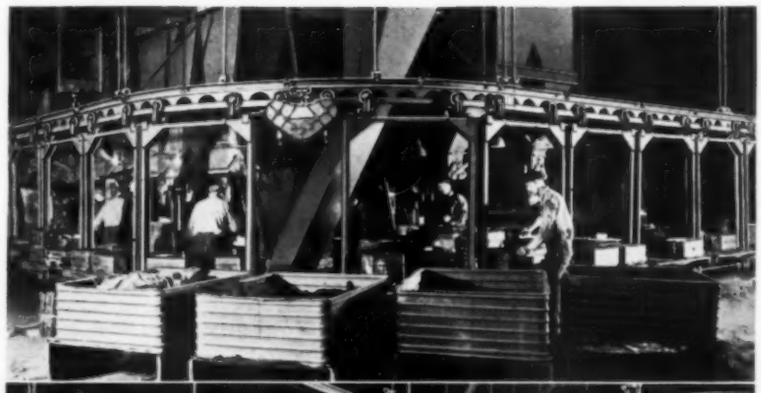
Use Steel Castings on Hot Metal Car

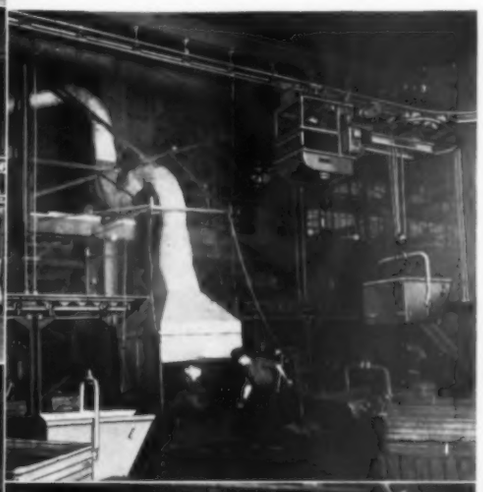


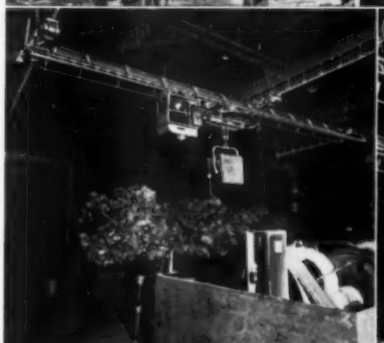
CAST steel heads and pouring spout with a rolled steel shell are welded together to form this new type, self-dumping, hot metal transfer car. Developed by the Bartlett Hayward division, Koppers Co., Baltimore, Md., the car has a molten metal capacity of 125 long tons, and is 28 feet long from center to center of the spherical trunnions. All joints in ladle body heads and spouts were butt welded, and furnace normalized.

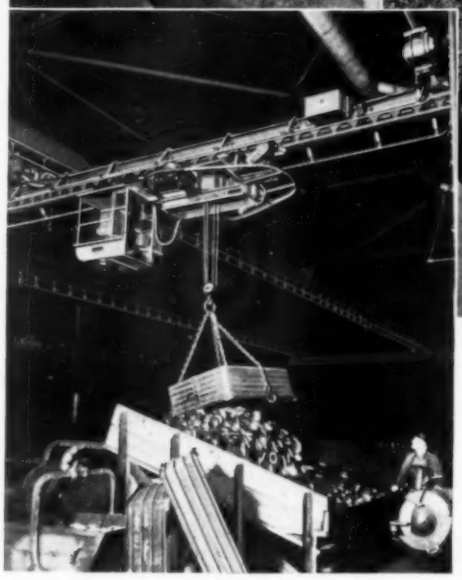
CLEVELAND TRAMRAIL

MATERIALS HANDLING EQUIPMENT









In the Foundry—

● Cleveland Tramrail Tractor Unit pulling racks at 25 F. P. M. through the molding, pouring and shakeout zones.

● Tramrail Cab Controlled Motor Operated Carriers and Transfer Bridges handle castings from the shakeout to and through the cleaning processes.

ALSO BUILDERS OF

CLEVELAND CRANES

FOR EVERY INDUSTRY

CLEVELAND TRAMRAIL

Division of

THE CLEVELAND CRANE & ENGINEERING CO.

1155 Depot St.

WICKLIFFE, OHIO

Or consult your phone directory under Cleveland Tramrail.

Melting Nonferrous Metals

(*Concluded from page* 71)

Melting cycle should be as short as possible. Since the different types of fuels, burners and furnaces affect the melting rate, it is hard to state what should be the time for melting a given charge. With a well heated crucible to start with and with good combustion conditions, it should not take over 30 to 35 minutes to melt 150 pounds of bronze or brass ingot. If conditions are such that more time is being consumed, a careful study of the conditions should be made to determine the cause for delay and it should be corrected.

In operating a furnace with oil as fuel, the color of the flame is indicative of the completeness with which the combustion is taking place, unless some other influence colors the flame. Of course, here again the different kinds of oil, as for example, the Texas oils and the Pennsylvania oils each has its peculiarities; but in general, the flame should be well tipped with a greenish color.

If best results are to be secured, there should not be a violent rushing of the flame from the furnace, which means that heat units are being rushed out of the furnace before they have had a chance to do effective work or to be absorbed by the charge.

Air Pressure Low

Some burners are designed to operate on low pressure air. Others depend upon the air pressure to vaporize the oil and, therefore, must have a higher pressure of air to break up the oil into small particles for intimate mixture with the air, and thus insure good combustion. Intimate mixture of the air and oil is of primary importance if combustion of the oil is to be complete. Some burners mechanically break up the oil and then mix it with low pressure air.

Operation of a furnace of this type requires experience just as in the case of other types of furnaces to insure the best results. Best results are to be obtained by burning the absolute minimum amount of oil and developing the maximum temperature possible with the combustion of such oil. This means perfect combustion of the oil and a truly oxidizing atmosphere, since there must be an excess of oxygen to burn all of the oil completely.

In operating these furnaces the atmosphere must be maintained slightly oxidizing to insure complete combustion of the oil and to avoid the presence of gases that have not been completely burnt. Those gases are soluble in the metals being melted and later on cause gas holes in the solidified castings.

Where gas is the fuel, it only is necessary to mix this gas with the proper amount of air to insure complete combustion. Flow of the superheated atmosphere produced by the combustion of the fuel should not be too rapid so that ample time will elapse to permit absorption of heat units by the charge before burnt gases leave the furnace.

Where trouble results from the operation of burners and furnaces, manufacturers usually are well equipped to make a study of conditions that will help to uncover any troubles that arise and to recommend changes that will correct the difficulties. Air lines should be as direct as possible so as to reduce friction losses.

Bends Reduce Flow

Sudden bends in the pipes carrying the air will make a considerable difference in the supply of air to the burner. Too small a pipe line will also be found to cause trouble sometimes. Burners may get out of alignment. Burner orifices become clogged with slag or broken pieces of refractory.

Good practice requires that furnaces be well taken care of each and every day that they are operated. After each day's operation the furnaces should be cleaned and put into first class operating condition for the day to come. Adjustments should be made where necessary in the burner or burner openings and care should be taken to see that no mechanical damage has occurred during the day's operation.

If furnaces are connected by a flue to stack outlets, the flue should be cleaned and examined to make sure that nothing has been misplaced. If the furnace is of that type in which the crucible is placed for repeated meltings and charges are poured from it as an integral part of the furnace, care should be taken to see that the crucible is cleaned each night. In fact, it should be cleaned after each melting to free it of the slags that adhere to the surface.

After each day's operation the crucible should be inspected carefully to see that no material damage has occurred. Such crucibles should be inspected periodically on the exterior to see that no mechanical or other kind of damage has taken place so as to prevent the unexpected breakdown of the crucible and consequent spilling of the charge into the furnace cavity.

The lining of the furnace should be watched carefully to see that it is not slagging away excessively. If it is slagging away more than is reasonable, the cause should be determined immediately and the cure applied to correct the condition. The slag hole in the furnace should be kept clean and open.

Covers to furnaces should be given excellent care. Many of these furnaces have a hole in the center of the cover which is the only vent through which the spent gases are exhausted. This hole may change in dimensions and therefore will affect the melting conditions.

The top of the furnace upon which the cover rests should be kept clean so that the cover may make a relatively satisfactory contact and the height of the cover above the crucible lip will be maintained at its proper position. To have the cover too far above the crucible lip frequently will reduce the efficiency of the furnace.

To have it too close to the crucible lip will set up a resistance to the flow of gases through the furnace. That may change materially furnace atmospheric conditions and reduce melting speed, or it may not affect the speed of melting but will change the atmosphere sufficiently to produce gases that are detrimental to the charge. Location of cover may cause those gases to eddy into the crucible.

Choose Refractory Materials

Refractory material used for the furnace lining or cover should be chosen with due regard to the condition under which the furnace will operate. Furnace manufacturers frequently can give sound advice on the subject of the preferred types of refractories for their own furnaces. However, it should be remembered that conditions in one part of the country may be such that fuels of one type are more economical than others and these fuels may produce conditions in the furnace requiring different types of refractories.

To reduce the number of joints in any given lining, many furnace manufacturers have had special shapes produced by refractory manufacturers so that a minimum number of pieces constitute a complete lining. This means a reduction of joints where slagging of the lining begins. An important precaution in lining these furnaces is to see that the clay used in bonding the joints does not react chemically at elevated temperatures with the clay from which the refractory lining material originally was manufactured. If such a condition does exist, the lining rapidly slags away at the joints. Consequently, the best practice is to have the same type of clay for bonding at the joints as that which constitutes the brick lining itself.

SAND INSULATORS

SAND BINDERS

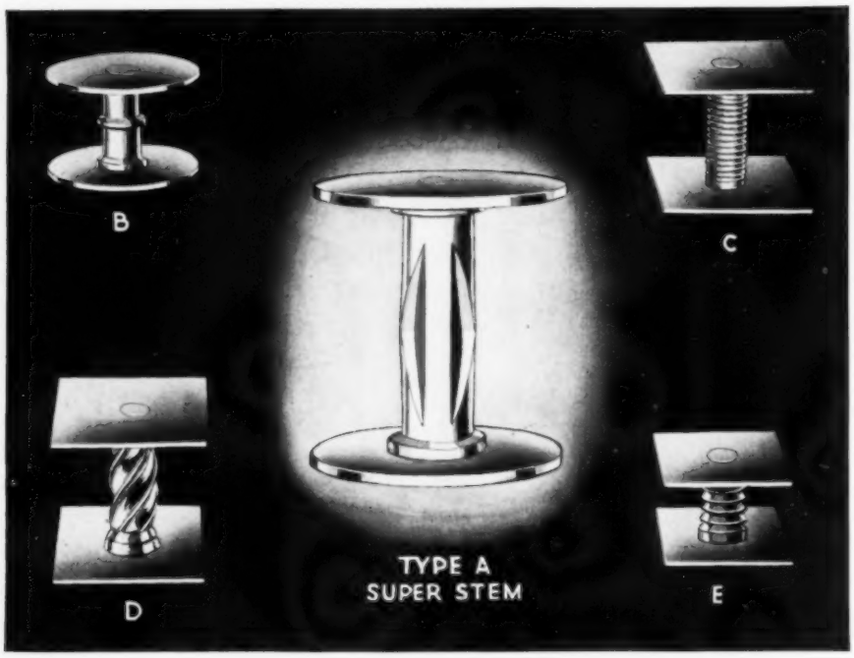
FANNER CHAPLETS

OVER 100,000,000 IN STOCK

ALL TYPES OF STEMS

EXACT IN HEIGHT

QUALITY



SERVICE

EXPERIENCED FOUNDRYMEN PREFER THE SUPER STEM TYPE A

FANNER CHAPLETS

MADE accurate by experienced men.
MATERIAL of special analysis proved best for foundry practice.
COATED 99-9/10% pure tin or copper.
SAVE castings.

●

QUALITY MANUFACTURERS KNOWN THE WORLD OVER FOR DEPENDABLE PRODUCTS

●

The Fanner Manufacturing Co., Cleveland, O.

The Canadian Fanner Ltd., Hamilton, Canada

BOOTH

21

Make Steel For Four Decades

(*Continued from page* 70)

mind and the members prefer to think straight in a clean foundry. Cleanliness and good housekeeping are exemplified in every department kept in good order by a vacuum cleaning system installed by the United States Hoffman Machinery Corp., New York. Interior surfaces necessitating the full time service of a painter are colored according to the following color scheme: Light gray for wood and brick; aluminum for steel; red for sprinkler pipes; light blue for water pipes; buff for steam returns, orange for gas pipes; gray for air pipes and black for electrical conduit.

Over a period of years several buildings have been added to the group which constitutes the plant. The original building with roof raised to accommodate three 10-ton cranes made by the Harnischfeger Corp., Milwaukee, and extended to cover a floor area of 62 x 300 feet, now is the main bay of the foundry. A side bay houses the mold and core drying ovens, ladle repair, core making, sand preparation departments, and the electrical equipment for operating the furnace.

Dry sand molds are made in the west end of the main bay in the vicinity of the drying ovens. Cables attached to the cars and reeved through sheaves anchored in the floor facilitate pulling the cars into and out of the ovens by one of the cranes. The molds are assembled, closed and poured on a section of the floor set apart for the purpose next to the molding floor. Castings are made in such wide variety that most of the molds are rammed by hand with pneumatic rammers, but a space on the east side of the pouring floor is equipped with two jolt ram rollover machines made by the Herman Pneumatic Machine Co., Pittsburgh, for the production of castings on long running order. As the molds are made they are placed on long transfer devices made up in

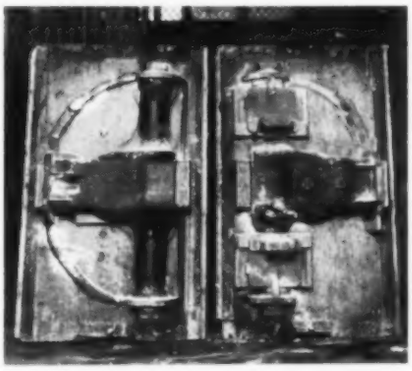


Fig. 7—Showing gating arrangement on large split pattern

pairs of steel beams. The loads are picked up as units by the crane and placed on the oven car in stacked formation. The greater part of the remaining floor space in the main bay is devoted to the production of small and medium size castings in green sand molds.

Molds are shaken out in a space at the east end of the main bay. The larger castings loaded on narrow gage railroad trucks are taken first through a passage equipped with sandblasting apparatus. After any adhering sand has been removed, the castings are taken to an adjoining building where the heads are cut off with acetylene torches. The building is equipped with the necessary appliances for grinding, chipping and testing the castings. Ordinary annealing or special heat treatment is given the castings in three electrically heated furnaces. Castings slightly distorted or varying in dimensional tolerances as a result of the heat treatment are corrected under a hydraulic press. Practically all these features conform to standard or routine steel foundry practice and do not warrant further or extended comment.

Small castings are loaded in steel buckets and taken into a separate cleaning room equipped with sand blast apparatus and a battery of tumbling barrels. Grinding, chipping, annealing, inspection and shipping follow the routine observed in the cleaning room devoted to the medium weight and heavy castings.

A large and well equipped chemical and physical testing laboratory facilitates maintenance of close control over incoming raw materials, molding and melting methods and quality of finished product in outward appearance and in conformity to dimensional specifications and physical properties. Demands of customers have grown increasingly insistent in recent years and the Smith Steel Foundry Co., not only has met, but in many instances has anticipated certain improved features and incorporated these features in the product. In addition to plain carbon steel, castings are made in a wide variety of alloys including a metal of high magnetic permeability for motor housings and other pieces of equipment.

Base sand for the molds and cores is silica from an Illinois deposit, showing, according to American Foundrymen's association standards, a grain fineness of 55. The various sand mixtures are prepared in a

(*Concluded on page* 144)

Various Sand Mixtures Used in the Foundry

No. 1—Hard sand facing for large dry sand molds:

New sand, 700 pounds
Silica flour, 2 gallons
Bentonite, 2 quarts
Cereal binder, 3 quarts
Rosin base binder, 1 quart
Fire clay, 3 gallons

Moisture content, 4.7 per cent
Permeability, 100
Green shear, square inch, 2.2 pounds
Dry shear, square inch, 100 pounds
Compression, square inch, 7 pounds

No. 2—Pocket sand for pockets enclosed in heavy sections:

New sand, 450 pounds
Silica flour, 250 pounds
Bentonite, 1 quart
Cereal binder, 3 quarts
Proprietary dry binder, 4 quarts

Moisture content, 8 per cent
Permeability, 15
Green shear, square inch, 2 pounds
Dry shear, square inch, 220 pounds
Green compression 6.5 pounds

No. 3—Green sand for machine and bench:

New sand, 700 pounds
Bentonite, 8 quarts
Cereal binder, 1½ quarts
Silica flour, 1 shovel
Fire clay, 4 quarts

Moisture content, 3.2 per cent
Permeability, 160
Green shear, square inch, 2.1 pounds
Green compression, 6.5 pounds
Dry shear, square inch, 50 pounds

No. 4—Black sand facing for dry sand and skin dried molds:

Reclaimed sand, 700 pounds
Bentonite, 2 quarts
Cereal binder, 2 quarts

Moisture content, 3.5 per cent
Permeability, 175
Green shear, square inch, 2.2 pounds
Green compression, 6.7 pounds
Dry shear, square inch, 50 pounds

No. 5—Regular core sand:

New sand, 600 pounds
Fire clay, 3 gallons
Cereal binder, 2 quarts
Proprietary dry binder, 4 quarts
Silica flour, 3 shovels

Moisture content, 6 per cent
Permeability (green), 60
Green shear, square inch, 1.3 pounds
Green compression, 3.5 pounds
Dry shear, square inch, 150 pounds

No. 6—Oil core sand, for collapsible cores:

New sand, 600 pounds
Core oil, 7 pints
Cereal binder, 5 quarts

Moisture content, 5.5 per cent
Permeability (green), 70
Green shear, square inch, 0.8 pounds
Dry shear, square inch, 200 pounds

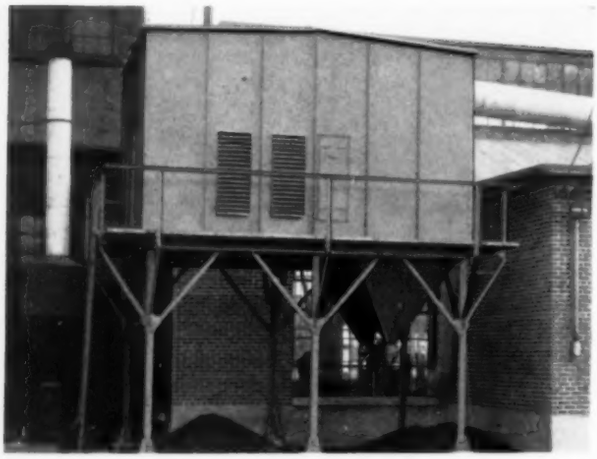
No. 7—Core backing sand:

Reclaimed sand, 2000 pounds
Rosin base binder, 16 quarts
Bentonite, 8 quarts

Moisture content, 4 per cent
Permeability (green), 100
Green shear, square inch, 2.0 pounds
Dry shear, square inch, 60 pounds

FOUNDRY DUST ARRESTING EQUIPMENT

SLY Builds the



• Dust Collection with the Sly cloth bag filters for such requirements as tumbling mills, grinders, airless and compressed air blast cleaning equipment.

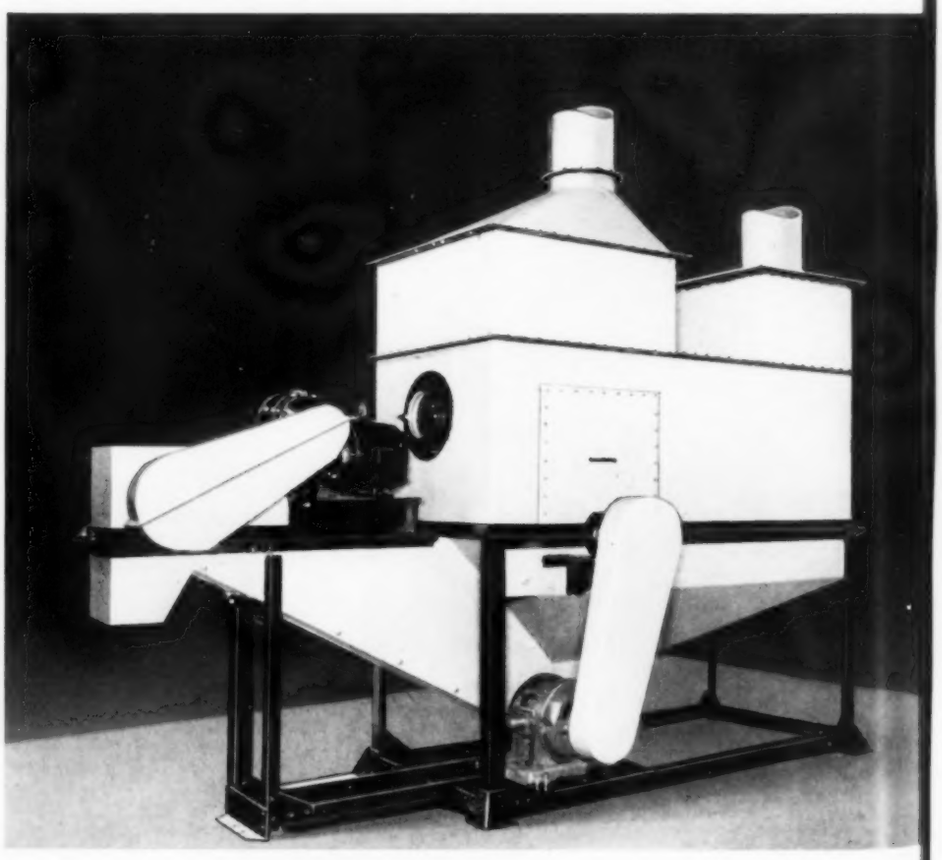
The fact that Sly pioneered and developed the cloth type industrial dust filter, it is only natural that foundrymen everywhere recognize and accept the Sly filter as the leader. For over 60 years Sly has served the foundry field with satisfaction. The new flat cloth bag filter, constructed for the positive suppression of dusts at their source, is preferred. It has been tested and tried under the most exacting conditions.

● This filter is divided by a partition into two filtering sections with separate exhaust fans. One section filters air from a blast room, second section filters air from tumbling mills and grinders. Fan house on the clean air side of the filter. Air exhausted by fans escapes through the fan house louvres.

REGARDLESS of the DUST CREATING CONDITIONS SLY MEETS ALL REQUIREMENTS

• For dusts created under such conditions as excess heat, moisture, acids, paint spray booths and dust accompanied by lint, as well as other conditions where cloth type collectors are not applicable, we offer the improved "Centri-Merge" Wet Collector.

The photo shows this new improved "Centri-Merge" Wet Collector, complete and ready for installation. No auxiliary equipment, such as pumps, settling tanks or pits, are required. The "Centri-Merge" is a completely contained unit. The collected dust is removed in the form of sludge from the collector by a conveyor which operates continuously. Industries having dust problems such as those listed above should investigate this new collector. Over 100 of these units are now in operation. See our demonstration at the coming Foundry Show, Booths E2-1 to E2-6 inclusive.



THE W. W. SLY MANUFACTURING COMPANY
CLEVELAND, OHIO

eComplete Line!

CASTING CLEANING EQUIPMENT

SLY BLAST CLEANING EQUIPMENT

Always designed and constructed for profitable foundry production

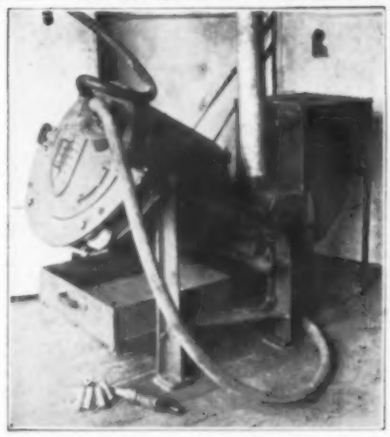
THE SLY LINE COVERS ALL CLEANING EQUIPMENT REQUIREMENTS FOR—

ABRASIVE CLEANING METHODS—

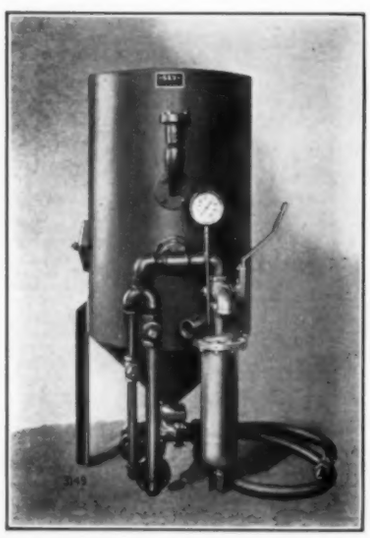
- Blast Rooms
- Turntables
- Blast Mills
- Blast Tanks
- Blast Cabinets

TUMBLING METHODS—

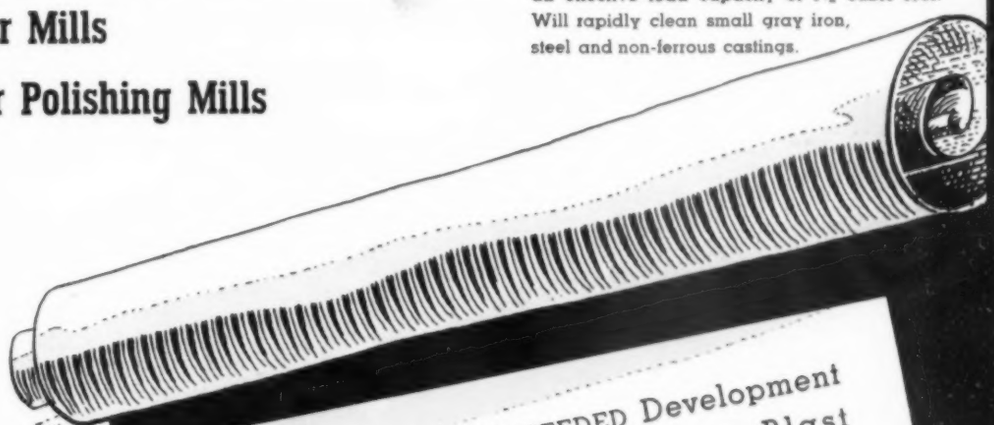
- Continuous Tumbling Mills
- Continuous Cooling Mills
- Intermittent Type Roller Bearing Mills
- Intermittent Type Chill Bearing Mills
- Cinder Mills
- Water Polishing Mills



The popular No. 4 Tilted Blast Mill, having an effective load capacity of $1\frac{1}{2}$ cubic feet. Will rapidly clean small gray iron, steel and non-ferrous castings.



Type "H" Pressure Blast Tank, for sand or metal abrasive, having an extra large capacity of eleven cubic feet.



NEW A NEEDED Development for Continuous Blast Cleaning. Sly announces a *new* blast cleaning mill, using the *centrifugal* blast method. *No shut-downs for loading or unloading.*

This will be a sensation at the coming Foundry Show. Do not fail to see it at Booths E2-1 to E2-6 inclusive.

(*Concluded from page* 141)

muller supplied by the National Engineering Co., Chicago. As a result of extended investigation and experiment suitable mixtures have been developed and standardized for many different classes of castings as shown in the accompanying table.

In this classification No. 1 as a hard sand used for facing the heavier castings on the floor and on the jolt machines. These molds are coated with silica wash and either dried in the oven or skin dried. No. 2 is known as pocket sand and is used in pockets surrounded by heavy metal sections in dry sand molds. No. 3 is a green sand mixture for lighter machines and bench work. It will be noted the sand in each of these mixtures is new sand. Mixture No. 4 used extensively for many castings of medium section contains no new sand. It is a reclaimed product. The molds faced with this material are coated with silica wash and either dried in the oven or skin dried with a torch. Reclaimed sand also is used in No. 7, backing sand for cores. No. 5 is the regular core sand mixture, while a mixture for collapsible cores, very hard after baking, is indicated in No. 6.

Adventures of Bill

(*Concluded from page* 96)

dressed me as Dear Bill and wound up with the standard British your's faithfully."

"Don't tell me any more," I said. "Your low foundry perverted sense of humor saw in this the heaven sent opportunity to add to the world's store of misinformation. You and Fibber McGee ought to get together."

"You do me a cruel injustice. Here is an earnest pilgrim seeking the light and you basely insinuate that I hung a wrecker's lantern over the cliff and lured him on to destruction. On the contrary, my dear doubting Thomas, I wrote him as follows:

Upon arrival at San Francisco you can procure all the necessary equipment for the safari at Whistling Willie's place on the Embarcadero; Huskies, mustangs, pack and saddle; birch bark canoe; snow shoes for climbing up the mountains and skiis for sliding down the opposite side; bowie knife and derringer for minor brawls and bickerings; elephant gun for long distance work on road agents and wild Indians. Under a recent ruling of the Great White Father at Washington, a bounty of $5.00 per head (1 quid) less sales tax, head tax, undistributed profits tax, income tax, social security and old age pension is paid for each pair of these varmint's ears. With any kind of luck you should about break even.

In the sparsely settled districts where no money has been in circulation since 1929 you will have to depend on barter and trade. In the larger communities where the dollar now is worth only 59 cents I shudder to think of the difficulty you will experience in converting these figures into pounds, shillings and pence. Are you familiar with the slide rule, or as it is better known in American patois the slippery stick? You will find some snow in the mountain passes over the high Sierras, but your dog team should make good time across the level prairies. Once you have forded the Mississippi, just turn to the right and any trapper will direct you on the comparatively short trail to Cleveland.

"All I have to say," I said, "is that you will have to hop faster than a kangaroo to keep out of that lad's way after he gets here."

Gray Iron Founders Hold Meeting

(*Concluded from page* 67)

Wis.; Franklin R. Hoadley, president, Atwood Machine Co., Stonington, Conn.; R. E. Kucher, vice president, Olympic Foundry Co., Seattle; H. R. Lafferty, vice president, Red Jacket Mfg Co., Davenport, Iowa; W. P. Laytham, president, Wm. P. Laytham & Sons Co., Paterson, N. J.; S. C. Mefford, secretary-treasurer, Auburn Foundry Inc., Auburn, Ind.; W. F. Mosser, secretary-treasurer, W. F. Mosser & Son, Allentown, Pa.; R. D. Phelps, president, Francis & Nygren Foundry Co., Chicago; J. H. Pohlman, vice president, Pohlman Foundry Co. Inc., Buffalo; Peter E. Rentschler, president, Hamilton Foundry & Machine Co., Hamilton, O.; Walter L. Seelbach, secretary-treasurer, Forest City Foundries Co., Cleveland; A. H. Torrence, treasurer, Indiana Foundry Co., Indiana, Pa.

The following officers were elected at a meeting of the board of directors following adjournment: President, C. R. Culling, vice president, Carondelet Foundry Co., St. Louis; vice president, R. E. Kucher, vice president, Olympic Foundry Co., Seattle; secretary, J. H. Pohlman, vice president, Pohlman Foundry Co. Inc., Buffalo; and treasurer, S. C. Mefford, secretary-treasurer, Auburn Foundry Inc., Auburn, Ind.

Open house was held at 6 p.m. followed by a banquet at which Peter E. Rentschler, the retiring president, and C. B. Magrath, former president, made informal remarks.

Standard Brake Shoe & Foundry Co., located at Memphis, Tenn., and Pine Bluff, Ark., has appointed the Modern Supply Co., 100 South Jefferson street, Chicago, as sales representative in the Chicago territory.

Malleable Casting Is Rod Hammer

To secure high resistance to impact, and corrosion, and to obtain other high quality physical properties, malleable iron castings are used for vital working parts of a ground rod hammer produced by Hubbard & Co., Pittsburgh. The hammer, shown in this accompanying illustration permits rapid driving of a ground rod to any desired depth by one man standing upon the ground.

Both hammer and carriers are malleable castings, and the chuck consists of a malleable iron body containing manganese steel wedges.

Hammer and carrier are malleable castings

Precision casting of the hammer and chuck body permits a symmetrical blow and so minimizes the danger of rod bending.

In operation the rod is inserted into the chuck, secured, and the hammer slid over the rod. Driving is done by striking the chuck body with the hammer, which fits over the wedges but does not strike them. Reversal of the hammer and insertion of an additional small rod section into the chuck jaws will permit final driving to the ground surface.

Bureau of mines, Washington, has issued a 55-page mimeographed bulletin which contains the annual report of the metallurgical division for the fiscal year 1936-37, and summarizes briefly the progress made in various activities in which the different sections are engaged.

Modernize YOUR MATERIAL HANDLING SYSTEM Now !!

WITH NEW . . . . . .

TRADE AUTOMATIC MARK

LOW LIFT TRUCKS . . . . . .

Model "LN-3"—6000 Lbs. Capacity

Model "LN-5"—10,000 Lbs. Capacity

YOU WILL GET LOW-COST TRANSPORTATION WITH THESE "AUTOMATIC" ALL-STAR FEATURES

★ **MODERN CHASSIS STYLING**—Sturdy Durable "All-Steel" welded and riveted construction. . . . Deep sectioned members and solid steel main load frame. . . . Low center of gravity. . . . Clear under-clearance.

★ **IMPROVED DRIVE AND LIFT MECHANISM**—Highly efficient spur gear transmission, self lubricating, powered by heavy duty "AUTOMATIC" high starting torque motors completely enclosed. . . . Full floating drive axles fitted with exclusive "Y" type compensating universal joints. . . . Non-friction multi-lift platform connections.

★ **NEW trade — "ROTOR-BRUSH POWER-FLOW CONTROL" — mark for DRIVE AND LIFT.** Unmatched in design with new type CONSTANT TENSION SELF-ALIGNING "ROTOR-BRUSHES" and COMMUTATOR TYPE UNIT MOLDED "STATOR-SEGMENTS." . . . Outstanding in smooth performance with perfect safety, minimum arcing and long electro-mechanical life.

★ **FULLY EQUALIZED TRAIL AXLES** — Center-pivoted alloy steel . . . fully compensating for uneven runways. . . . Steering knuckles center pivoted on wheels for shockless steering . . . no tire drag or pinching. . . . Main steering connections dust-proof ball and socket type.

★ **STURDY RUNNING GEAR** — Large diameter wide faced tires and wheels. . . . Mounted with adjustable double roller bearings.

★ **SAFETY FEATURES**—Interlocking brake mechanism. . . . Positive action. . . . Wide faced adjustable shoes. . . . Built in dynamic brake for controlled speed on ramps. . . . Heavy steel bumper around operator's platform. . . . Pedals rubber padded for sure footing. . . . Gravity load completely stabilized and cushioned. . . . Loud electric signal. . . . Safety grip on steering handles.

★ **GREATER BATTERY CAPACITY** — Large well ventilated compartments. . . . Batteries removable from sides or overhead.

USE THE COUPON

Get the complete facts on any of these trucks or send for the new 1938 "AUTOMATIC" catalog on Modern Material Handling Equipment.

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DIV. OF THE YALE & TOWNE MFG. CO.
121 W. 87th St. CHICAGO, ILL.

Gentlemen: Please send details on trucks referred to by
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Name_____ Position_____
Address_____
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SURE YOU SEE THESE NEW "AUTOMATICS" AT THE CLEVELAND FOUNDRY SHOW . . . BOOTHS 47½-48-49 AISLE No. 2

Ventilates Cupola Fallacies

(*Concluded from page* 73)

$\sqrt{P}$ for various blast pressures.

Consider for example the second item in Table III where the cupola is operating at 8 ounces, or 70.6 per cent normal amount of air. What would happen if the speed of the blower were increased to deliver twice as much air? Twice 70.6 per cent is 141.2 per cent of normal air. According to the table the cupola pressure would be about 32 ounces. The motor would have to be large enough to carry the increased load. If the amount of air is doubled, the motor would have to be twice as large just to carry the additional load of air. If the pressure is increased from 8 to 32 ounces the size would have to be multiplied by 4 to carry the load against the additional resistance. For example, if a 5 horsepower motor was sufficient to operate the blower originally and the air delivery was doubled, the motor would have to be 45 horsepower or 9 times the size of the original 5 horsepower motor, provided 5 horsepower was just the right size for the smaller load. The blower also would have to be designed to deliver air against a resistance of 36 ounces.

Increase Depth of Bed

Table V shows the proper bed height for various cupola pressures.

Speed of the blower should not be increased or attempt made to use more air in the cupola until proper adjustment is made in the depth of the coke bed. Operating at 8 ounces pressure, a good bed height is 36 inches. A lower bed eventually will mean cold iron while a higher bed means a waste of fuel. Operating at 8 ounces, the speed of the cupola easily can be increased by using more air provided the depth of the coke bed is increased. If the amount of air is doubled, the new pressure would be 32 ounces and the depth of coke bed 66 inches.

Careful study of the tables will show that a cupola is quite flexible and that the melting rate, for any given diameter, may vary over an extremely wide range. For example, the formula showed the hourly melting rate for a 48-inch cupola with an 8 to 1 fuel ratio and 9 ounces pressure is only 5.4 tons. It would be much less with a fuel ratio of 6 to 1. The normal rate is 9 tons per hour, and could be considerably higher with high fuel ratios and cupola pressures above 16 ounces.

A cupola works most satisfactorily when operating conditions are normal or above normal and indifferently when operating conditions are below normal.

Normal air requirement for a 48-inch cupola is about 4000 cubic feet per minute, yet it will function to some extent with 2000 cubic feet or with more than 6000 cubic feet, provided the coke bed is the proper depth. This is a 50 per cent variation on either side of normal requirements. Much stress has been placed on the need for using definite weights or volumes of air for each size cupola. Actually, satisfactory conditions may extend over a wide range. The important factor is to establish suitable melting practice for the particular conditions, then maintain this practice day in and day out as closely as possible.

Melt Steel in Cupola

When steel is charged into a cupola, some of the carbon in the fuel is dissolved by the metal during melting. All the fuel is not consumed in generating heat for the melting process. For example, a cupola charge of 90 per cent steel may have only a total carbon content of 0.8 per cent going in but may have as much as 2.90 per cent in the metal at the tap hole. This increase of 2.10 per cent in carbon content is equivalent to 45 pounds of coke per ton of metal melted. With a coke charge of 285 pounds per ton, the apparent fuel ratio is 7 to 1, but the actual fuel ratio is 285 less 45 or 240 pounds per ton, an 8.3 to 1 ratio. The formula to determine the melting rate of a cupola is based on the fuel burning rate, in this case 240 pounds and not 285 pounds of coke. For each 10 per cent of steel in the cupola charge it is safe to assume that 5 pounds of coke per charge on a ton basis is dissolved by the metal. For example, if a 2000-pound cupola charge contains 40 per cent steel, and the coke charge is 250 pounds, the apparent fuel ratio is 8 to 1, but the actual fuel ratio is based on 250, less 20 pounds or 230 pounds per ton, a ratio of 8.7 to 1.

Don't expect to improve your cupola performance unless the cupola is equipped with a pressure gage and unless definite knowledge of the cupola pressure is available.

Don't expect air weighing or air metering devices to tell how much air is lost between the air measuring device and the cupola coke bed.

Don't expect the blower or the blower motor to deliver air to the cupola unless the blower is designed for the necessary volume and pressure and the motor is large enough to carry the load.

Don't expect to improve cupola operation if the coke is two, three or four times the proper size for the cupola.

Don't expect to improve cupola practice if the amount of fines in the charge is nil on some charges and a considerable amount on other charges.

Don't debate on cupola practice, unless in position to specify the cupola diameter, fuel ratio, blast pressure and the exact weight of coke and iron charges.

Book Review

A Manual of Porcelain Enameling, edited by J. E. Hanson, 514 pages, fabrikoid, published by the Enamelist Publishing Co., Cleveland, and supplied by THE FOUNDRY, Cleveland, for $5.00 and in Europe by the Penton Publishing Co. Ltd., London.

This new book, edited by J. E. Hansen, service director of the Ferro Enamel Corporation, makes use of some material from its predecessor, *The Advanced Technique of Porcelain Enameling*, which was published 5 years ago. Most of the text is new, for the many recent developments and improvements in the enameling industries have made necessary a new study of methods and practice.

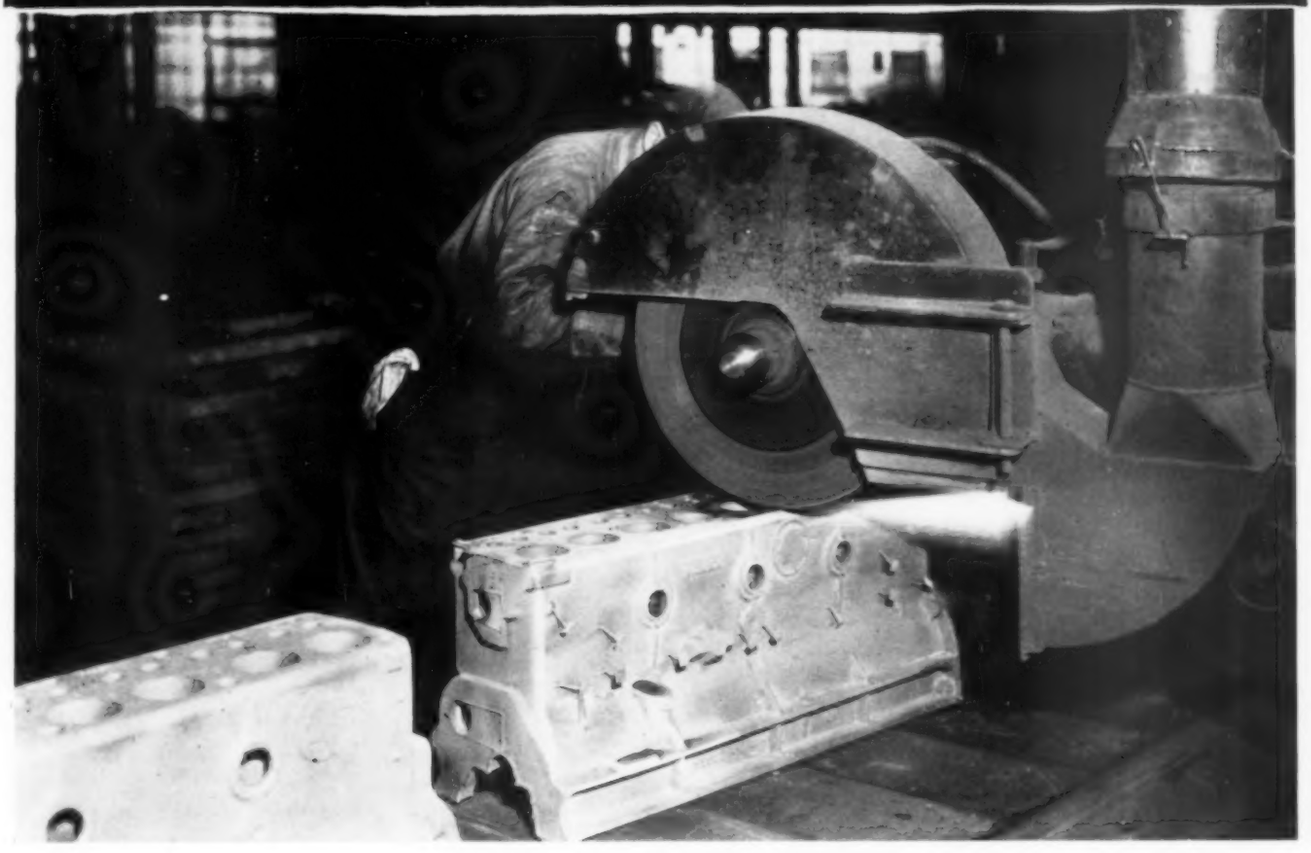
The editor of the book has been assisted by more than a dozen specialists, each of whom has contributed one or more chapters on particular problems and applications of enameling processes. At the back of the manual are tables of useful data, an enameler's dictionary, and a complete glossary of the technical jargon of laboratory, smelter, mill room and furnace room.

The third chapter, by R. B. Schall, which deals with cast iron for enameling purposes, is a discussion of foundry practice for castings which are to be enameled. It is a comprehensive treatment of features of raw material choice, melting and molding practice, and of the features of pattern design which seem to be generally applicable.

Other chapter headings are: History of the Art; Design and Fabrication of Sheet Iron Parts; Preparation of Metal Surfaces; Enamel Mill Room Practice; Mill Additions; Water and Air Supplies for Enameling Plants; Application of Enamel; Drying; Brushing; Enameling of Signs; Enameling of Hollow Ware; Burning; Inspection; Decorative Effects; Shop Troubles; Process Control; Muffle Furnace Atmosphere and Temperature Gradient Effects; Fuels and Their Combustion; Enamel Shop Construction, Equipment and Layout.

Fairbanks, Morse & Co., Chicago, recently moved its general office to the Fairbanks-Morse building at 600 South Michigan avenue.

MACKLIN
Grinding Wheels



Swing frame grinders equipped with Macklin Grinding Wheels serve the automotive industry on many jobs. Illustration shows Macklin Wheel grinding cylinder block castings. Proper selection of wheels assures efficient and economical results. "Protect Your Production" with Macklin Grinding Wheels.

MACKLIN COMPANY

Manufacturers of GRINDING WHEELS—JACKSON, MICHIGAN, U. S. A.

Sales Offices:—Chicago - New York - Detroit - Pittsburgh - Cleveland -Cincinnati - Milwaukee-Philadelphia

GLOBE SHOT

H.C. CHILLED GLOBE SHOT

Whether you require steel abrasives for use in centrifugal blasting equipment or for use in blasting machines using compressed air, there is a proper size of Globe Shot or Grit specially adapted to provide just the finish you desire—for large or small, light or heavy, grey iron, malleable or steel castings, as well as forgings, billets, sheets, etc.

Thirty years experience in the manufacture of steel abrasives and thirty years contact with cleaning problems of many varied kinds, have enabled Globe to develop superior steel abrasives—steel shot and steel grit. The fact that leading foundry supply dealers, and blasting equipment manufacturers recommend their use for best cleaning results is a tribute to Globe's years of effort to advance efficiency and economy in cleaning.

The efficiency and economy of any cleaning machine depends upon the abrasive used in it. Why invest large sums in modern and efficient cleaning equipment and then limit its usefulness by using anything except the most efficient steel abrasives?

Globe's leadership in quality—in hardness, toughness and cleaning efficiency is unquestioned—and Globe's unequalled production facilities enable us to provide prompt shipment to users of large quantities insuring continuous operation of their cleaning departments without delay.

Welcome Foundrymen
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CLEVELAND
CONVENTION

THE GLOBE STEEL ABRASIVE CO.

Dept. F **Mansfield, O.**

Established 1907

CORNERED STEEL GLOBE GRIT
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GLOBE CORNERED STEEL GRIT

The particular structure of Globe Grit provides longer life of the abrasive and consequent lower abrasive costs. Ask for genuine *GLOBE "Cornered" STEEL GRIT.*

OBITUARY

ERLE J. BYERLEIN, president and general manager of the Milwaukee Foundry Equipment Co., Milwaukee, died March 30 at his home in Progreso, Texas. Mr. Byerlein was born in Saginaw, Mich., April 6, 1891. He attended the public schools and served his time as a pattern maker in Saginaw. After some time spent traveling about the country as a pattern maker, he returned to Saginaw to take charge of the pattern shop and eventually the foundry of Nelson Bros. In 1915 he published a book on "How to Make and Use Match Plates." Mr. Byerlein left Nelson Bros. to enter the molding machine field and in 1924 formed a company to manufacture molding machines of his own design. He also developed a hydraulically operated briquetting press. Mr. Byerlein was active as president and general manager of the Milwaukee Foundry Equipment Co. until the time of his death.

♦ ♦ ♦

J. Henry Sleath, 70, foreman of the gray iron foundry, Union Mfg. Co., New Britain, Conn., since 1915, died March 22 at the Hartford hospital. Mr. Sleath became connected with the Union Mfg. Co. in 1883, and with the exception of a few brief absences, continued in its employ until his death, making a total of more than fifty years of active service with that organization.

♦ ♦ ♦

Olaf J. Peterson, aged 55 years, sales representative for S. Obermayer Co., Chicago, died at his home in Oak Park, Ill., on April 8. He had been associated with the Obermayer company for over 40 years.

♦ ♦ ♦

E. F. Bolte, 70, retired vice president, International Harvester Co., Chicago, died recently.

♦ ♦ ♦

Edward H. Matthews, 63, secretary - treasurer, Smith - Matthews Foundry Co., Detroit, died at Harper hospital in that city on April 5.

♦ ♦ ♦

Harry F. Pankhurst, 63, for 30 years treasurer of the American Shipbuilding Co., Cleveland, died in his home in that city on March 21.

♦ ♦ ♦

William Hubers, 82, vice president and director of the Blackhawk Foundry & Machine Co., Davenport, Iowa, died recently. Mr. Hubers, who was one of the founders of the company, came to the United States from Germany in 1871 and went directly to Davenport.

♦ ♦ ♦

William L. Gregg, 76, for many years president of the Fuller-Warren Co., Milwaukee, died March 22. He retired 8 years ago after an executive association of 47 years with the firm.

♦ ♦ ♦

Edward Hopkins, 65, vice president and naval architect, Toledo Shipbuilding Co., Toledo, O., died April 2 at his home in that city. Mr. Hopkins had been with the company since its organization in 1906. He also had been employed by the Detroit Shipbuilding Co., now a part of the American Ship Building Co.

Builds New Plant

Norton Co., Worcester, Mass., is erecting a four-story building, 333 x 60 feet, at a reported cost of $263,000 to replace the 53-year old plant and old office building.

Atlas Foundry Co., Detroit, has been licensed by the Meehanite Metal Corp. of Pittsburgh, to make castings of Meehanite.

Trade School Boys Make Patterns

ACCOMPANYING illustrations show boys of Cleveland Trade school patternmaking division at work on patterns for use in the annual molding contest held in connection with the American Foundrymen's convention, May 14-19 at Cleveland. Two finished patterns are shown in the center. Boys to the right and left are shown working on similar patterns. This selection is regarded as a signal honor for the Cleveland Trade school since the patterns are sent from one city to another where candidates are entered in the molding contest.

The apprentice molding contest has been an interesting feature of the conventions for several years and students from the Cleveland school have been prize winners repeatedly. The school will have a working representation besides panel exhibits in the Cleveland exhibit hall where according to present indications the largest collection of foundry equipment and supplies ever shown in one place, will be on display. The patternmaking and foundry divisions of the Cleveland Trade school were added to the school by the Cleveland board of education in 1929 and have attracted considerable favorable comment.

A Cordial

SINCE 1892

With the publication of its September, 1938 issue, THE FOUNDRY will have completed forty-six years of uninterrupted service to the foundry industry.

We reflect with satisfaction on the part it has been the privilege of THE FOUNDRY to play in the growth and development of the foundry industry during this eventful half-century.

To the thousands of foundrymen who are the foundry industry, we express our appreciation for their many years of readership and for their assistance in making THE FOUNDRY more than a mere paper and ink interpretation of foundry news and practical information pertaining to casting practice.

Now and in the years to come, THE FOUNDRY aims to serve its industry by serving each individual foundryman in as personal and helpful a way as possible.

■ *THE FOUNDRY exhibit will occupy Booths 40 and 41 — immediately to the right in the Arcade entrance to Exposition Hall — Cleveland Public Auditorium.*

J. M. LATHROP
Advertising Manager

F. G. STEINEBACH
Editor

PAT DWYER
Engineering Editor

EDWIN BREMER
Metallurgical Editor

L. C. PELOTT
Chicago

Welcome!

We extend a most cordial welcome to all of you—visiting foundrymen, exhibitors and representatives—to make THE FOUNDRY exhibit space your "general headquarters" while at the convention.

You are invited to drop in on us frequently when in Cleveland, and take advantage of a spot prepared for you as a place to rest, to meet friends, to renew old acquaintances, and to talk things over.

The entire staff of THE FOUNDRY will be in attendance, ready to serve you, to make your stay in Cleveland as pleasant and profitable as possible.

THE FOUNDRY

A PENTON PUBLICATION

J. F. AHRENS
New York

S. H. JASPER
Pittsburgh

A. L. KLINGEMAN
Cleveland

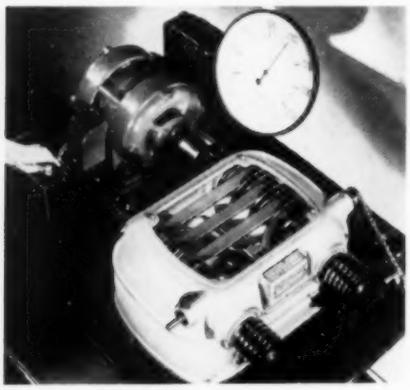
R. C. WELLMAN
Circulation Manager

G. A. POPE
Asst. Adv. Mgr

NEW EQUIPMENT and SUPPLIES

Speed Changer

Texrope division, Allis-Chalmers Mfg. Co., 1126 South Seventieth street, Milwaukee, recently has placed on the market a new speed



Speed changer unit is provided with manual control but can be equipped with both electric and manual remote control

changer unit. This totally enclosed unit, designed with double shaft extensions and driven with a standard motor, is claimed to be adaptable to widely varied uses.

Hand wheel control is provided when manual adjustment only is desired, but the unit can be equipped with both electric and manual remote control. Range of capacity of the unit as now developed is up to 33 horsepower with ratios as high as 3¾ to 1. This speed changer is designed for use where material handling equipment must be controlled.

Propeller Fans

Propellair Inc., Springfield, O., has developed a new line of propeller type fans for ventilating equipment. These fans have been designed for use in duct systems and for other similar systems where resistances to air flow are encountered.

Construction, together with newly designed fan wheels, is said to enable the fans to handle economically those duct system jobs which formerly required costly and cumbersome equipment. Fans are available in various sizes and various horsepower ratings to give the desired results at different stages of

Propeller fan with newly designed fan wheels is for use in duct system

pressures encountered over a wide range of jobs.

Push Buttons

A new line of heavy duty push buttons has been introduced by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. Eight different units, including lamp receptacle and rotary selector switches, have been so designed that they may be grouped together in desired combinations to meet specific application requirements. Push-button stations of one to seven units are available in heavy drawn steel cases with baked enamel finish. The standard enclosure has a cover consisting of the top and sides in one piece. Main spring and moving contact spring are both of stainless steel, and the double break contacts are heavily silver plated.

Aluminum Shovels

Wood Shovel & Tool Co., Piqua, O., recently placed on the market a new shovel made of aluminum alloy. Use of aluminum alloy, it is claimed, reduces the weight to half that of the average shovel thus eliminating 3 to 5 pounds of dead weight every stroke. Because these shovels are noncorrosive and specially designed they are claimed to be unusually easy to keep clean. Due to the use of specially treated aluminum alloy, it is said these shovels are not only rust-proof but also acid-resisting and nonsparking. The company makes these aluminum alloy shovels in seven different models.

Aluminum alloy shovel reduces weight lifted by workman

Safety IN THE *Foundry!*

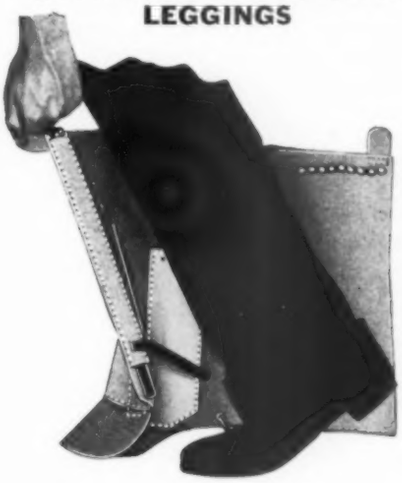
APPROVED SINGLE POUCH RESPIRATORS

AIR-FED SAND BLAST HELMETS

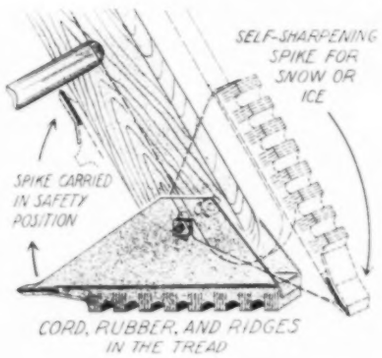
APPROVED DOUBLE POUCH RESPIRATORS

STEEL-GRIP SAFETY GLOVES

QUICK ACTION ASBESTOS LEGGINGS



NON-SKID SAFETY LADDER SHOES



In addition to the articles shown we have in stock safety items such as: **APRONS — GOGGLES — FOOT and TOE GUARDS — GOGGLE RESPIRATORS — SWEAT BANDS — SALT DISPENSERS**

• • *Everything for Industrial Safety* • •

Write in for Information and Details

PULMOSAN SAFETY EQUIPMENT COMPANY

176 Johnson Street
BROOKLYN, N. Y.

Sand Conditioner

Jeffrey Mfg. Co., Columbus, O., recently has announced a new semiportable foundry sand conditioner designed for grab-bucket feeding. This machine has a capacity of 45

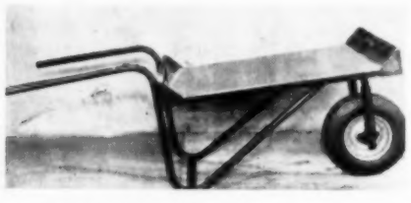
Semiportable foundry sand conditioner designed for grab-bucket feeding

tons per hour. Continuous screening is provided by a positive eccentric type screen measuring 3 x 6 feet which discharges refuse to one side.

Conditioning is accomplished by a pair of heat-treated cutter bars which are made reversible for double wear. These throw the conditioned sand into piles or windrows ready for second use. The conditioner is equipped with a 7½ horsepower motor which is totally enclosed and fan cooled. Other features are: V-belt drives, dust sealed antifriction bearings throughout and full protection of all moving parts. The machine has a rigid frame, a 5000 pound capacity hopper, stands 8 feet high and is provided with grapple eyes for lifting and transport by crane.

New Barrow

Accompanying illustration shows a new product of Chicago Mfg. & Distributing Co., 1928 West Forty-sixth street, Chicago, called a pneumatic core-barrow. Spring arrangement and pneumatic tire are said to absorb bumps from rough floors before they reach the trays. The load



The load is sustained on springs and the top tends to remain level

is sustained on the springs and the top tends to remain level during use. Coil springs are designed for necessary resiliency under both light and heavy loads. The top, which is 24 x 40 inches, is made of a single piece of heavy sheet steel and the handles are of one piece. The wheel is equipped with ball bearings and total loading capacity is 500 pounds.

Saw Bench

Oliver Machinery Co., Grand Rapids, Mich., recently has placed on the market a new tilting arbor variety saw bench. This machine with motor on the arbor is designed for lighter work than were previous, similar machines manufactured by

The machine is designed for lighter work than previous models

the same company. Maximum cut to the left side of the saw is 19 inches and 27 inches to the right. The table is 34 inches high from the floor and is 34¾ inches long and 33¾ wide.

A feature of the machine is an aluminum guard which lifts automatically with the introduction of a board, rides flat as the board goes through and covers the front of the saw as the board passes. A steel blade splitter prevents pinching and there are catches on both sides to eliminate the danger of kick back. This machine is designed for cutting relatively heavy or large pieces of patterns.

Respirator

Chicago Eye Shield Co., 2300 Warren boulevard, Chicago, has designed a new respirator for use against lead and Type A dusts. Effective breathing area of over 45 square inches is claimed to eliminate fatiguing resistance to inhalation and increase breathing comfort. The exhale valve is placed between the filter units where it cannot catch on clothing. This valve is noncollapsible to prevent shutting off

New respirator has exhale valve placed between the filter units

the air when the head is bent downward and is designed with a sensitive diaphragm to enable the wearer to converse without removing the mask. The respirator is of light weight and is said to offer no obstruction to vision in any direction.

New Grinder

Hammond Machinery Builders Inc., 1605 Douglas avenue, Kalamazoo, Mich., has a new variable speed grinder on the market. Through the use of any number of desired speeds, the manufacturers claim the proper speed for efficient and safe grinding can be procured and that at the same time control of speed allows longer use of a worn wheel. It is said that neither the main spindle nor bearings are disturbed when

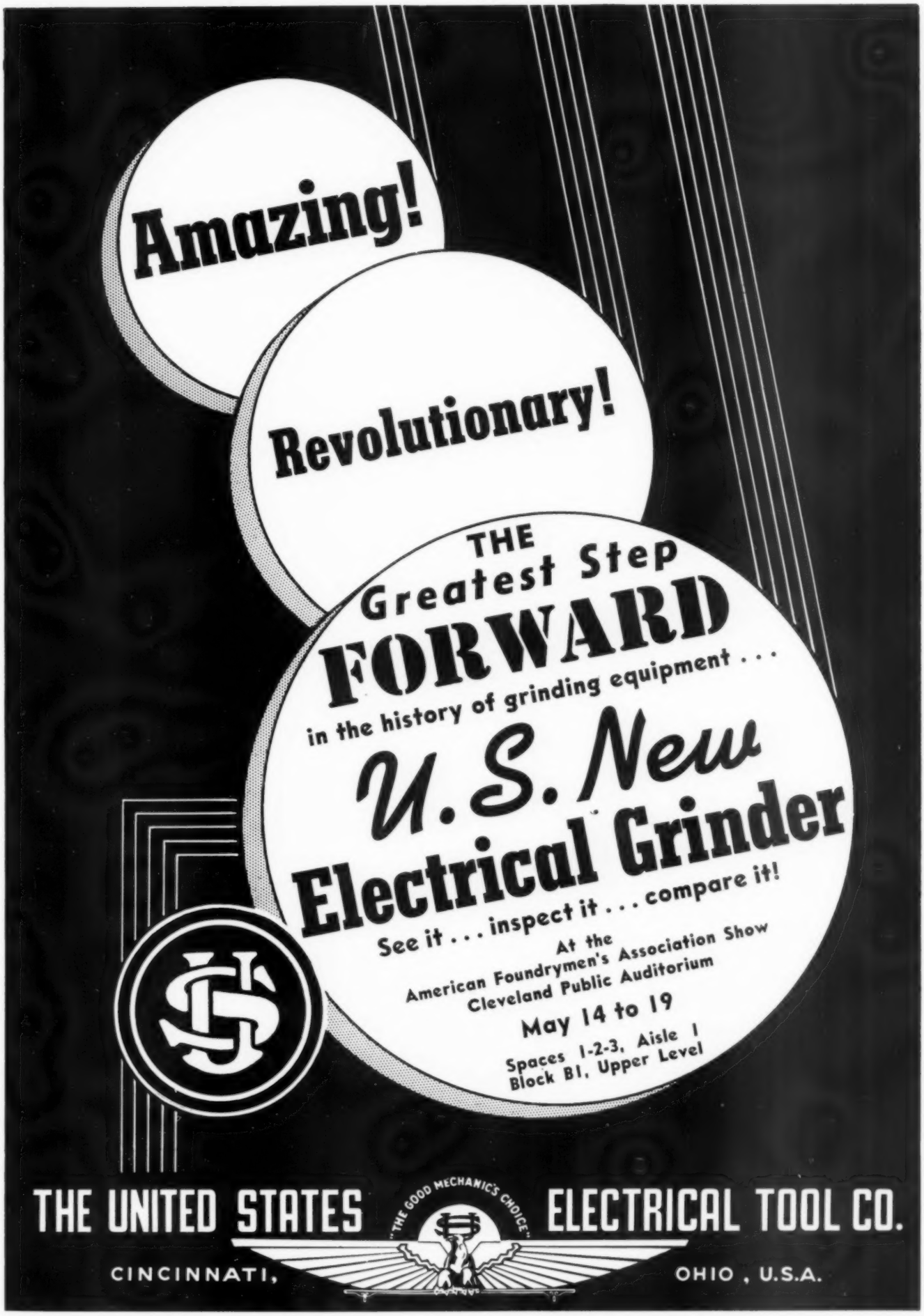
Grinder is designed with many speeds to allow greater efficiency, safety and longer use of wheels

replacing belts. The grinder uses a wheel from 18 to 30 inches in diameter and a motor from 10 to 25 horsepower.

Sodium Lamps

General Electric Co., Schenectady, N. Y., has put on the market a line of sodium lamps designed for outside use in company yards, driveways, docks, parking lots, loading and receiving platforms and outside

(Concluded on page 157)


Amazing!
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Greatest Step
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in the history of grinding equipment . . .
U.S. New
Electrical Grinder
See it . . . inspect it . . . compare it!
At the
American Foundrymen's Association Show
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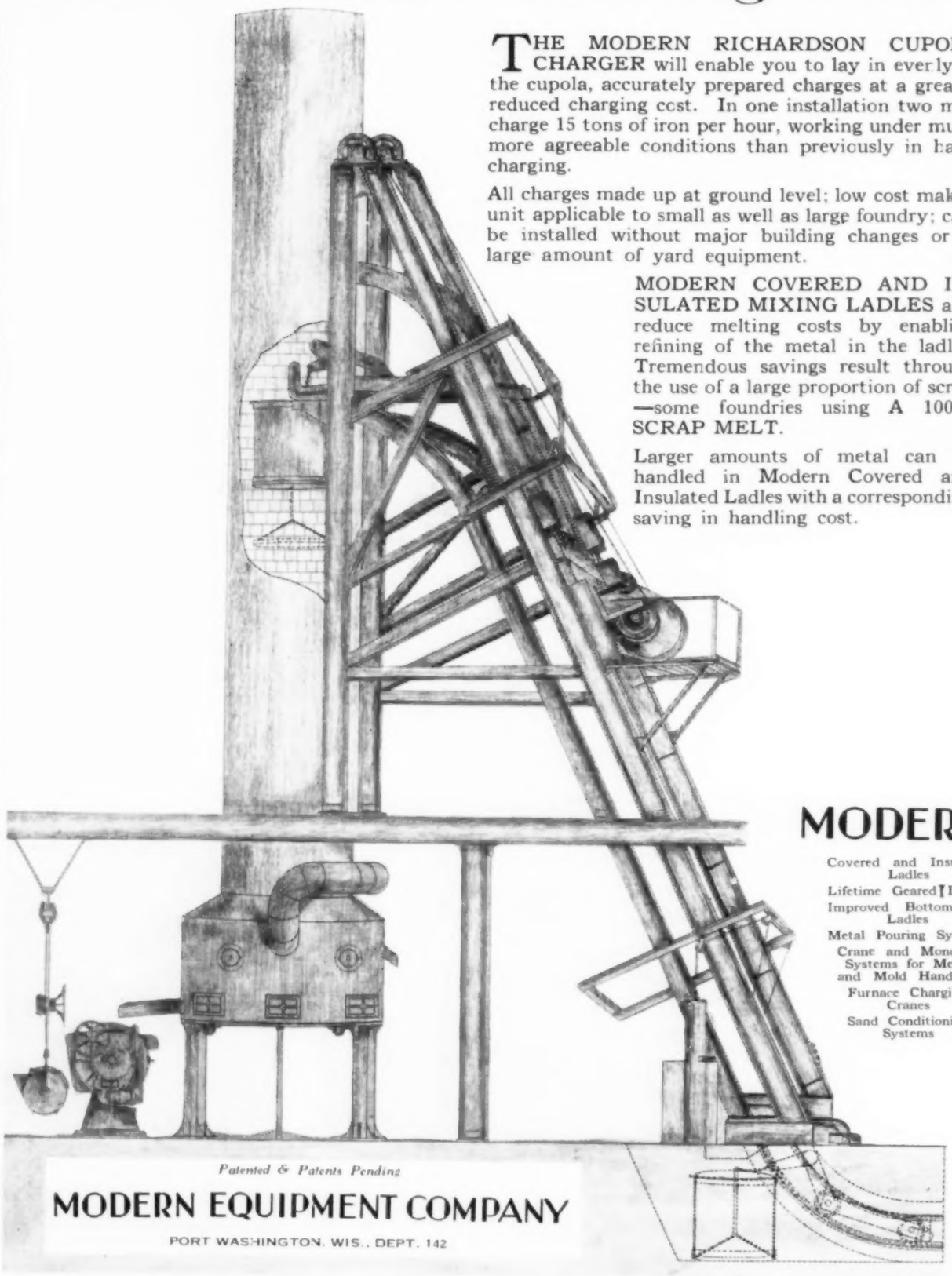
Spaces 1-2-3, Aisle 1
Block B1, Upper Level
THE UNITED STATES ELECTRICAL TOOL CO.
"THE GOOD MECHANIC'S CHOICE"
CINCINNATI, OHIO, U.S.A.

Reduce Your Melting Costs



THE MODERN RICHARDSON CUPOLA CHARGER will enable you to lay in evenly in the cupola, accurately prepared charges at a greatly reduced charging cost. In one installation two men charge 15 tons of iron per hour, working under much more agreeable conditions than previously in hand charging.

All charges made up at ground level; low cost makes unit applicable to small as well as large foundry; can be installed without major building changes or a large amount of yard equipment.

MODERN COVERED AND INSULATED MIXING LADLES also reduce melting costs by enabling refining of the metal in the ladles. Tremendous savings result through the use of a large proportion of scrap —some foundries using A 100% SCRAP MELT.

Larger amounts of metal can be handled in Modern Covered and Insulated Ladles with a corresponding saving in handling cost.

MODERN

Covered and Insulated Ladles
Lifetime Geared Ladles
Improved Bottom-Pour Ladles
Metal Pouring Systems
Crane and Monorail Systems for Metal and Mold Handling
Furnace Charging Cranes
Sand Conditioning Systems

Patented & Patents Pending

MODERN EQUIPMENT COMPANY

PORT WASHINGTON, WIS., DEPT. 142

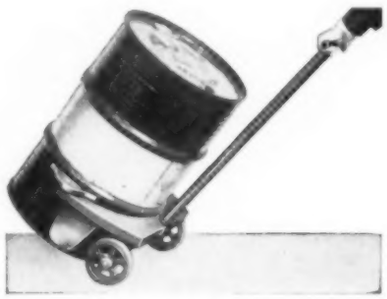
MODERN EQUIPMENT CO.

(*Concluded from page* 154)

storage areas. The lamps generate light by the passage of an electric current through sodium vapor rather than through ordinary metal filaments. Light output is about equal to that of 500-watt incandescent lamps, but the increased size of the light sources is said to give lower brilliancy and less eye discomfort. Overall consumption of each unit is about 255 watts.

Hand Truck

Wash. Co. Inc., Danville, Ill., has introduced a new hand truck for the transportation of relatively



Two grab members hold the drum when the handle is tilted

heavy 50 gallon standard drums in factories and warehouses. The device, shown in the accompanying illustration, automatically grabs the drum; tilting the handle raises the drum to transporting position, and automatically releases it at the time of unloading. Two grab members, curved suitably at the forward ends, move pivotally to adjust themselves to the arcuate portions of the drum. When the truck is tilted toward the operator, they close in to grip firmly, and when the load is deposited, they disengage.

Electric Drill

A portable electric drill, weighing 9 pounds and measuring 12 inches in overall length, has been developed by the Independent Pneumatic Tool Co., 600 West Jackson boulevard, Chicago. Although it has been designed as a portable unit, it is claimed that this ½-inch drill can be converted into a drill press by mounting in a drill stand. It can be supplied with 110 or 220 alternating or direct current motor which will operate from any ordinary power source. Free speed is 450 revolutions per minute and full load speed 300 revolutions per minute. Moving parts revolve on ball bearings. The spindle and lower armature bearings are seal tight so grease cannot enter the field case from gear case or be thrown around the spindle. Upper armature bearing is sealed in grease. Field case, handles, center plate and gear case are die cast from aluminum alloy. Gears and shafts are made from alloy steel.

Potentiometer

General Electric Co., Schenectady, N. Y., has developed a portable dew-point potentiometer for use in determination of moisture content of atmosphere in industrial metal heat-treating furnaces. The instrument consists of a polished, metallic mirror located in a small chamber in such a manner that it can be seen through a sight glass, with means for cooling the mirror and reading its temperature. Gas to be tested is passed continuously through the chamber; and, as the temperature of the mirror is lowered by a jet of carbon dioxide or some other gas from a storage tank directed against the back of the mirror, a spot of dew appears when the dew point temperature of the gas is reached. A light gage thermocouple and a balancing circuit, with direct-reading mirror, have been designed to allow accurate reading of the mirror temperature at the instant that the dew appears.

Respirator

Mine Safety Appliances Co., Braddock, Thomas and Meade streets, Pittsburgh, recently has

Respirator fitted with soft rubber face cushion

placed on the market a respirator with design changes. The unit is shown in the accompanying illustration. It weighs less than 3¼ ounces and it is claimed provides full protection with utmost comfort under the most severe working conditions. The respirator is said to permit full vision in any direction, not to interfere with wearing goggles, spectacles, welding helmets or head covering of any kind. All metal parts are aluminum, easily replaceable and may be sterilized at any time. This also includes the easy fitting soft rubber face cushion. It is stated that the filter will eliminate dust particles as small as 1 micron with efficiency and without breathing resistance. Replacement of filters requires but a few seconds.

Flexible Coupling

Link-Belt Co., 307 North Michigan avenue, Chicago, has developed a new flexible coupling which is said to embody several major improvements over the company's roller chain coupling long supplied for connecting shafting in line. It consists of two cut tooth sprocket wheels which are connected by a piece of specially constructed single-width finished steel roller chain, using a divided roller feature which combines the advantage of double roller chain with the more rugged construction of single width chain. The divided roller provides independent roller action for each sprocket, and as the contact between roller and sprocket causes the roller to revolve on its bushing, any tendency to scuff the rollers and sprocket teeth is said to be avoided. Longer coupling life, and extension of the range of efficient application, are claimed for the new coupling.

Other improvements concern the grease-retaining housing or casting, which, when specified, is supplied for enclosure and automatic lubrication of the coupling. Use of two fittings, 180 degrees apart, inside the housing, permits the packing of the housing with grease without dismantling. Another change is said to furnish a better seal between the two halves and to prevent leakage of grease.

Drawing of the new flexible coupling shows the divided roller feature

Stamps on Shafts

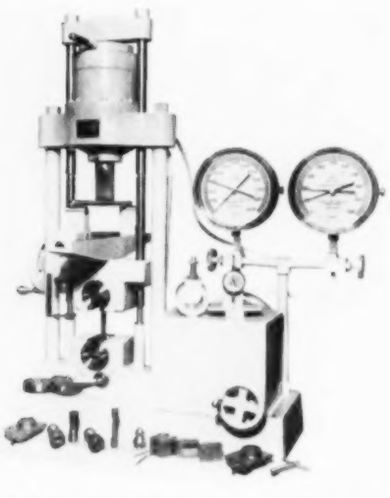
M. E. Cunningham Co., 107 East Carson street, Pittsburgh, has placed on the market a new, interchangeable type holder for stamping on

Holder is designed to hold type for stamping on round or curved surfaces

round or curved surfaces such as pipe or shafts. The device, shown in the accompanying illustration, contains a removable slide which holds the type. Only one holder is required for various radiuses, but it is necessary to have individual slides and corresponding type for each desired radius. Sides of the holder are knurled to give a firm grip, and it is said that the holder will not mushroom or spall in service.

Universal Tester

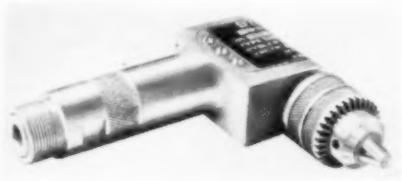
A universal testing machine, shown in the accompanying illustration, and made by the Steel City Testing Laboratory, 8843 Livernois avenue, Detroit, is designed for making tensile transverse and compression tests, also deflection and hardness on arbitration bars, cores or other materials. In this machine, operated hydraulically, the pressure cylinder is supported on two columns and the upper clamping head is adjusted vertically by nuts and worm gear. Pressure pump and load measuring instruments are mounted on a common base. In finely calibrated precision pressure gages a maximum hand remains at the point where the specimen breaks while the major hand returns to zero. A back pressure valve protects the gages against shock. Compression and bending tests are made in the space between the upper clamping head and the bottom of the pressure cylinder. Suitable tools can be supplied for making these tests. In the brinell test the specimen is placed on the lower compression plate. The upper plate is replaced by a fixture containing the 10 millimeter ball. A load of 6600 pounds, the equivalent of 3000 kilograms, the standard load in Brinell machines, then is applied.



Machine for tensile, transverse, compression, deflection and hardness tests

Drill for Corners

Stow Mfg. Co., Binghamton, N. Y., has developed a close corner angle head for drilling, filing, etc., in close quarters on a flexible shaft. The

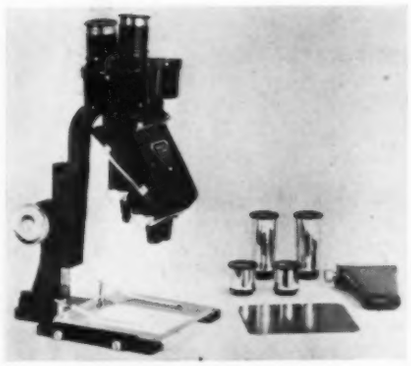


Angle head for flexible shaft is designed for work in close quarters

head is supplied with a ¼-inch capacity chuck for drills, rotary files, rasps, mounted grinding wheels and points, etc. Flexible shafts No. 1A, 2A or 3A may be used with the heads.

Microscope

Bausch & Lomb Optical Co., Rochester, N. Y., has developed a wide field binocular microscope useful for usual low power work. The unit is lighter and smaller than the Greenough type. It is available for either reflected or transmitted light, and is supplied with objectives and eyepieces to cover the general range of shop and school work. A dustproof shuttle nosepiece carries any two pairs of objectives in parfocal position. Full range of objectives and eyepieces is available for working



Microscope for Low Power Work

magnifications of 2.34 to 150 diameters.

Body of the instrument is same as the Greenough type, adjustable for interpupillary distance. Stage of the unit is equipped with removable glass insert and removable black and white metal plate. This permits proper contrast of the object under observation. Microscope may be placed directly on the work or it can be equipped with a base carrying a fork-mounted mirror for transmitted light, and a pair of arm rests.

Hand Lift Truck

Single stroke, side lift and balanced handle are features claimed by Yale & Towne Mfg. Co., 4530 Tacony street, Philadelphia, manufacturers of the hand lift truck shown in the accompanying illustration. The truck is equipped with cast wheels, roller treadle and automotive-type release check. Light weight is an outstanding feature claimed for this truck which is designed for a load range from 1000 to 2000 pounds.

Light weight is a feature of design of the truck

EFFICIENCY

"CERTIFIED" STEEL ABRASIVES

will increase your Blast Cleaning production and reduce your Blast Cleaning cost because—

20 bags of "Certified" Steel Grit, or Steel Shot, will do the work of a carload of sand.
"Certified" Abrasives are sharper, therefore cut quicker.
"Certified" Abrasives are easily cleaned, and may be used over and over again.
"Certified" Abrasives decrease Dust hazards.
"Certified" Abrasives eliminate laborious handling . . . require little storage space.

Most foundries are now specifying "Certified" Steel Shot or Grit and saving money. May we demonstrate to you?

VISIT OUR EXHIBIT AT THE FOUNDRY SHOW

PITTSBURGH CRUSHED STEEL CO.
PITTSBURGH, PENNA.

STEEL SHOT AND GRIT CO.
BOSTON, MASS.

FOUNDRY ACTIVITIES

EBERHARD MFG. CO., Cleveland division of the Eastern Malleable Iron Co., is spending $300,000 to re-equip the plant. Most of the money is being used to install a continuous production line in the foundry, which is the main part of the plant. Equipment being purchased includes a complete sand conditioning and handling system and mechanized mold conveyors. New core ovens are to be installed next year. A. L. Wheeler is managing director of the Eberhard division.

* * *

J. Rohm & Sons Foundry Co. Inc., Elizabeth, N. J. recently was incorporated. Elvin H. Ullrich is agent.

* * *

Conshohocken Pattern Works, Conshohocken, Pa. recently has been taken over by James Dickinson, formerly of Pawtucket, R. I.

* * *

Two molding shops of the Illinois Malleable Iron Co., Chicago, recently were destroyed by fire. Loss was estimated at $10,000.

* * *

Hunter Foundry Co., 3547 South Morgan street, Chicago, recently was incorporated by G. Brovet, H. L. Hatch, and E. A. Austin.

* * *

Part of the main plant of the Des Moines Foundry Co., Seventh and Wabash streets, Des Moines, Iowa, recently was damaged by fire.

* * *

H. B. Smith Co. foundry, Westfield, Mass., which closed recently, will reorganize under Section 77 B and resume operations, according to Edwin W. Smith, president.

* * *

Pacific Coast Foundry division, Aluminum Co. of America, recently has been moved from 3110 Adeline street, Oakland, Calif. to 5151 Magnolia avenue, Los Angeles.

* * *

Wilson Stove & Mfg. Co. Inc., Metropolis, Ill., which has been idle for the past several years, will resume operations shortly. Repair work on the building and equipment already is nearing completion.

* * *

Brownsville Foundry & Machine Co., Brownsville, Pa., recently has been organized to produce furnace and stove castings and to do jobbing work. Grant Phillips is foundry manager.

* * *

Challenge Machinery Co., Grand Haven, Mich. is planning construction of an addition and alterations to its foundry building. Drawings are being prepared by Pierre Lindout, architect.

* * *

Index of foundry equipment orders for March, according to a report of the Foundry Equipment Manufacturers' association, Cleveland, was 114.6 as compared with 90.4 in February and 293.2 in March, 1937. Index of shipments was 99.4 as compared with 80.9 in February and 285.6 in March of the previous year.

* * *

Kendallville Foundry Inc., Kendallville, Ind. recently has been incorporated to operate a foundry and machine shop. William A. Maggart, Gust Busch, James G. Finley, Jacob Miller, George Steckly, John DeBelius, Henry W. De Belius and Maurice Shulze are the incorporators.

* * *

Magnesium Fabricators Inc., Adrian, Mich., has begun the construction of a foundry on its recently purchased site east of the Wabash on East Maumee street. The company will manufacture magnesium castings and permanent mold castings. The foundry will be 60 x 180 feet and the cost has been approximated at more than $75,000.

* * *

Production of malleable iron castings in the United States during 1937 showed the greatest volume since 1929, totaling about 688,000 tons, according to the Malleable Founders' society. Operations averaged 61.5 per cent of capacity during the year. Automotive manufacture absorbed 54 per cent of the tonnage, railroads 8 per cent, and miscellaneous 38 per cent.

* * *

Indianapolis Brass & Aluminum Foundry Co., 950 East Maryland street, Indianapolis, recently has installed additional new equipment which will increase the quality of its castings, according to I. W. Smith, president of the company. Included in the new machinery is water tumbling and sandblasting equipment for all types of castings. The foundry is affiliated with the Sonith Pattern Works, Indianapolis.

* * *

Production of gray iron and steel castings in the Philadelphia Federal Reserve district decreased further during February, according to reports of the Industrial Research department, University of Pennsylvia. The decrease in the production of steel castings was the largest during the past 6 months of decline, but the decline in output of gray iron castings slowed down with almost half the foundries in the district reporting an increase over January.

* * *

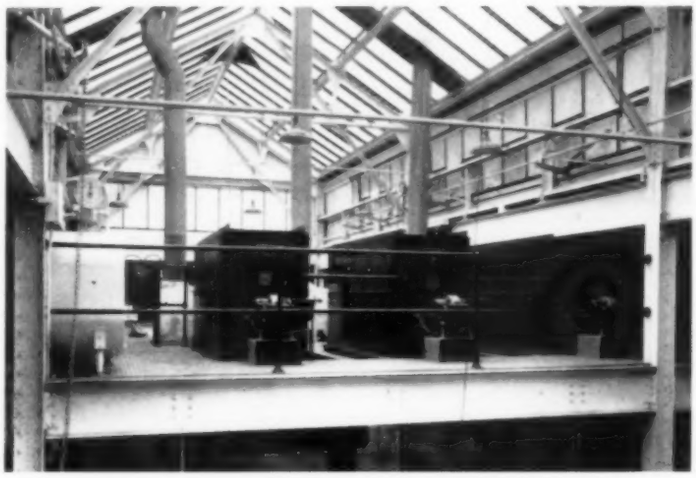
Youngstown Alloy Castings Corp., 103 East Indianola avenue, Youngstown, O., is expanding its facilities, and recently has leased the entire foundry building at its present location. The firm is erecting a second electric furnace, and just has completed installation of a car-type heat treating furnace, and a smaller unit. A new traveling crane has been installed as well as a shakeout platform. The firm produces various types of mill castings, and specializes in a pipe ball for production of lap-welded steel pipe. John Trantin Jr. is president of the Youngstown Alloy Casting Corp.

RAW MATERIAL PRICES

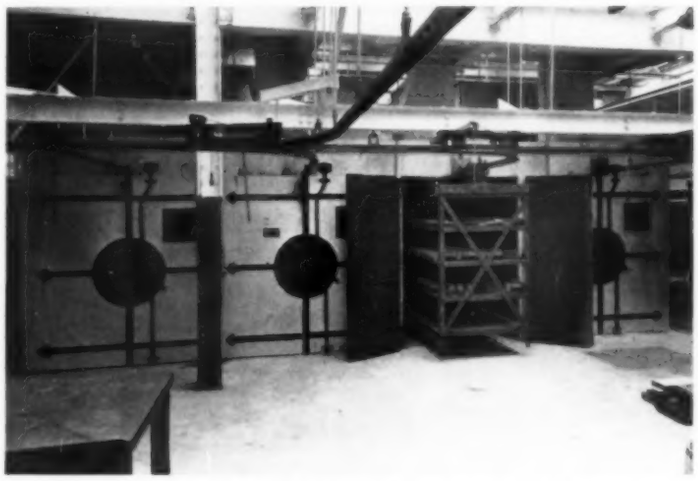
April 20, 1938

Iron	
No. 2 foundry, Valley	$24.00
No. 2 Southern Birmingham	20.00
No. 2 foundry, Chicago	24.00
No. 2 foundry, Buffalo	24.00
Basic, Buffalo	23.00
Basic, Valley	23.50
Malleable, Chicago	24.00
Malleable, Buffalo	24.50
Charcoal iron, furnace	27.00
Coke	
Connellsville beehive premium	$ 5.75 to $ 6.25
Wise county beehive coke	5.00 to 5.25
Detroit by-product delivered	11.10
Scrap	
Heavy melting steel, Valley	$12.00 to $12.50
Heavy melting steel, Pitts. (dlv.)	12.00 to 12.50
Heavy melting steel, Chicago	11.00 to 11.50
Stove plate, Buffalo	11.00 to 11.50
Stove plate, Chicago	7.50 to 8.00
No. 1 cast, New York	12.50 to 13.00
No. 1 cast, mchy., Chicago	11.00 to 11.50
No. 1 cast, Pittsburgh	14.50 to 15.00
No. 1 cast, Philadelphia	15.00 to 15.50
No. 1 cast, Birmingham	14.00 to 14.50
Car wheels, iron, Pittsburgh	14.50 to 15.00
Car wheels, iron, Chicago	13.00 to 13.50
Railroad malleable, Chicago	12.50 to 13.00
Malleable, Buffalo	13.00 to 13.50
Nonferrous Metals	**Cents per pound**
Castings copper, refinery	9.52½
Straits tin	38.87½
Aluminum, 99 per cent	20.00
Aluminum, No. 12 (Secondary, standard)	15.25 to 15.75
Lead, New York	4.50
Antimony, New York	13.75
Nickel, electro	35.00
Zinc, East St. Louis, Ill.	4.25

FOUNDRYMEN! BEFORE YOU BUY A CORE OVEN



Heater Platform Showing Front View of Heaters



Front View of Ovens Showing Rack Handling System

Heater Platform Showing Rear View of Heaters and Fans

●

Remember this:

during and after the convention you should see large core oven installations in actual operation in the foundry and in the core room—thus you are assured of the best and most efficient equipment for your money. Before you buy—

Consult

CARL-MAYER

●

At the left, for instance, is shown one of the finest modern oil-fired, air-heater, rack-type Core Oven Installations—a Carl-Mayer unit which is completely automatic, with electric ignition, recently installed at

THE GILBERT & BARKER CO.
(Subsidiary of Standard Oil Company)
Springfield, Mass.

Performance reports on this installation show:

- **FUEL CONSUMPTION:** only 5 to 6 gallons of oil per hour per oven.
- **BAKING TIME:** preliminary reports indicate upwards of 25% reduction in baking time over previous practice.

Write for literature to:

3031 EUCLID AVENUE — THE CARL-MAYER CORP. — CLEVELAND, OHIO

NEW TRADE PUBLICATIONS

Copies of any of the literature listed below may be obtained by writing directly to the companies involved, or by addressing THE FOUNDRY, in care of Readers' Service Department, 1213 West Third Street, Cleveland

GRINDING WHEELS — Norton Co., Worcester, Mass., has issued a 6-page leaflet which lists its complete line of foundry wheels for grinding operations on every type of casting. A complete table of foundry wheel recommendations is included, together with descriptions of the company's cut-off wheels, core files, and blast nozzles.

ELECTRODES — McKay Co., Pittsburgh, has issued a small leaflet which lists specifications, current values, and specific uses of its shielded arc welding electrodes.

FLASKS — American Foundry Equipment Co., Mishawaka, Ind., has issued a folder illustrating construction and design of its flasks. The folder includes details and pictures of the assembly and use of the equipment.

BLOWERS — Roots Connersville Blower Corp., Connersville, Ind. has published an 8-page leaflet describing the operating principles, construction, accessory equipment, net capacities, and dimensions of its rotary positive blowers.

ELECTRIC MOTORS — Century Electric Co., St. Louis, has issued a 4-page bulletin describing its automatic start induction polyphase motors. Pictures illustrate details of both construction and operation.

CUPOLA CHARGERS — Lake Erie Engineering Corp., Buffalo, has issued a 4-page bulletin describing construction and operation of its cupola chargers. Photographs and a typical layout sketch show the machines in operation.

SEPARATING EQUIPMENT — Deister Concentrator Co., Fort Wayne, Ind., has issued bulletin No. 14-H, a 20-page booklet describing and illustrating its line of vibrating screens. Illustrations show details of construction and actual installations.

ELECTRIC MOTORS — Fairbanks, Morse & Co., Chicago, has published bulletin 2260 on features of construction of its direct current motors and motor bearings. Motors in sizes up to 200 horsepower for both high and low voltage operation are illustrated and described.

FIRE BRICK — Quigley Co. Inc., New York, has issued an 8-page bulletin describing the advantages obtained with its insulating fire brick in a number of industrial installations. The bulletin also lists other refractories manufactured by the company for use in foundries and other industrial plants.

SANDBLAST GUNS — Michiana Products Corp., Michigan City, Ind., has issued a 4-page pamphlet describing and illustrating its sandblast guns. Besides construction details, the leaflet includes a series of micrographs which show finishes of surfaces cleaned with the company's sandblast guns.

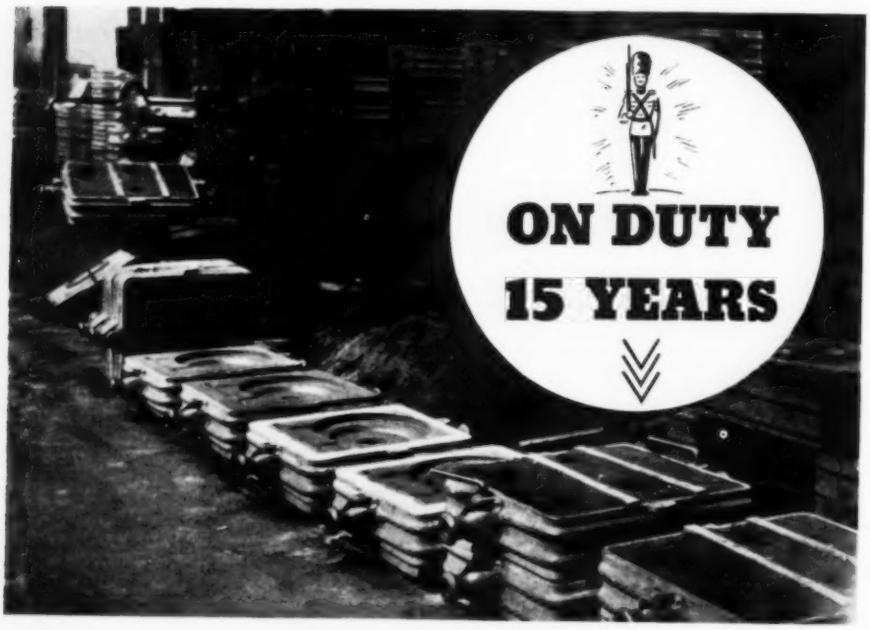
ELECTRIC MOTORS — "Electric Drive Selector and Hints on Maintenance" is the title of a 12-page publication recently prepared by Westinghouse Electric & Mfg. Co., East Pittsburgh. It describes and illustrates requirements which must be met in selecting motor, control, and circuit protection.

DUST CONTROL — "Dollars and Sense of Modern Cleaning" is the title of a new 8-page leaflet issued by the Invincible Vacuum Cleaner Mfg. Co., Dover, O. to illustrate advantages and uses of its industrial cleaners. Performance reports and many reproductions and photographs of equipment in use are included.

ELECTRIC TOOLS — Van Dorn Electric Tool Co., Towson, Md., has issued a 54-page catalog of its electric tools which lists specifications and prices. Among the tools manufactured by the company are drills, hole saws, tappers, screwdrivers, nut runners, glue heaters, portable saws, hammers, portable and bench grinders, and sanders.

INDUSTRIAL SANDS—New Jersey Silica Sand Co., Millville, N. J., has published an illustrated pamphlet covering many interesting features in connection with a property of 1200 acres. Illustrations show many of the operations and the mechanical equipment required in the production of many grades of sand, millville gravel, millville mold-

(*Concluded on page* 164)



Truscon Flasks Stand Up!

The Truscon Flasks illustrated have taken plenty of abuse in their 15 years of service in a Pennsylvania foundry. Yet their owner reports that *the maintenance cost on the entire lot of several hundred flasks has not exceeded $5.00 per year.* • If you want *low cost flask service,* write for the Truscon Catalog illustrated, as a starter toward that objective.

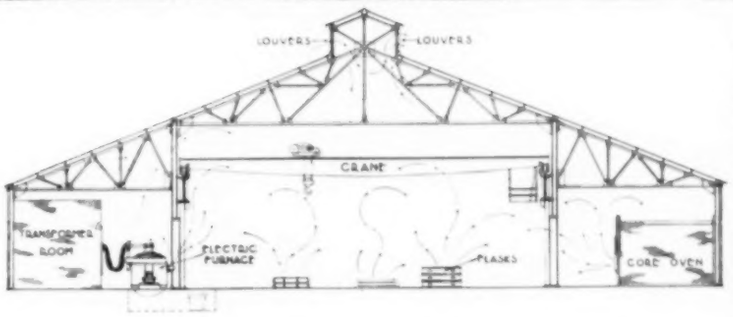
TRUSCON STEEL COMPANY • FOUNDRY FLASK DIVISION
6100 TRUSCON AVENUE • CLEVELAND, OHIO
SUBSIDIARY: Republic Steel Corporation

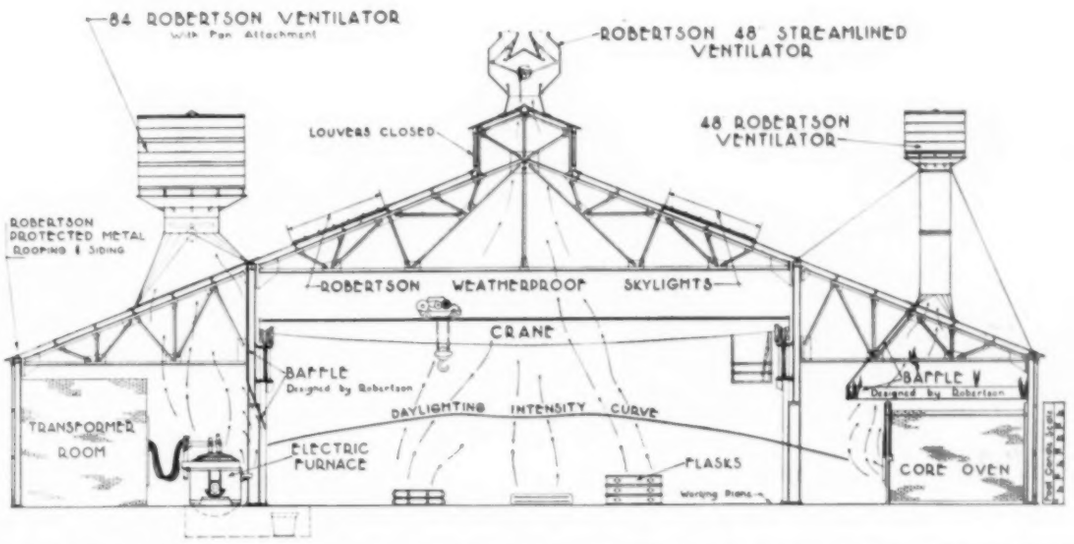
TRUSCON

COPPER-BEARING STEEL FOUNDRY FLASKS

The Robertson Way is the **MODERN WAY** to construct your Foundry Buildings

THESE TWO DRAWINGS *show better than any words of ours why so many foundries have agreed that the Robertson Way is the best way to cover, ventilate and daylight a plant. One drawing shows an ordinary foundry before Robertson Service is applied. The other shows a foundry constructed the Robertson Way. Which would you rather have?*





ROBERTSON PRODUCTS

THE Robertson Way includes the use of three outstanding Robertson Products. . . . (1) Robertson Protected Metal roofing and siding sheets . . . made to withstand the sulphurous acid fumes in foundries . . . and to cut maintenance costs to a new low by eliminating corrosion. (2) Robertson Weatherproof Skylights . . . built for any required roof load and designed to deliver maximum light with a minimum of glass. Available in the Standard type, and in the special Floating Mounting type for use where excessive vibration is a problem. And (3) Robertson Ventilators . . . the most efficient ventilators made, providing more air exhaust per dollar invested than any other kind. Available in Natural Draft, Fan Power, Streamlined, Rectangular and other types.

ROBERTSON SERVICE

ROBERTSON Foundry Service includes: (1) A thorough survey of your plant; (2) a review of our large file of previous foundry installations; (3) a recommendation showing ventilators properly placed for most efficient results, skylights installed where they will deliver the required daylight on the foundry floor (shown by our daylighting intensity curve . . . see drawing), and Robertson Protected Metal in place on roofs and sidewalls; and (4) a check-up and test of results after the job has seen service.

Investigate the Robertson Way to more efficient and economical foundries. Write for our free booklets which contain helpful information on Robertson Products. These booklets are called "Foundry Ventilation, Daylighting, Roofing," "Roofs Over Industry," "Robertson Ventilators," and "Skylight Data Book."

VISIT BOOTH 176
Cleveland Auditorium Exhibition
MAY 14th-19th
42nd Annual Convention
American Foundrymen's Assn.

H. H. ROBERTSON COMPANY
2014 GRANT BUILDING **PITTSBURGH, PA.**

(*Concluded from page* 162)

ing sands, furnace sand, cupola clays, silica sand, both angular and round grain. Formulas are included for 10 core and mold facing mixtures for iron and steel castings. A concluding table shows the classification of a wide variety of sands, clay class, fineness number, green permeability, moisture and amount retained on screens according to A. F. A. standards.

CONVEYERS — Mathews Conveyer Co., Ellwood City, Pa., has published a 116-page book of engineering and specification data on materials handling equipment. Twenty-eight types of roller conveyors are described, and designs for 20 different types of frames for conveyors are given in detail. A detailed description of ball bearing wheel conveyors includes 30 different types and shows typical frame construction with load ratings from 20 to 300 pounds per wheel. Other items illustrated are ball transfers, turntables, dollies, belt conveyors, and chain, gear, and belt driven live roller conveyors.

METAL COATING — Calibron Products Inc., West Orange, N. J., has published a 24-page bulletin which discusses metal coating processes now used, and describes a new process which is based on reactions between gases and solids. Coatings obtained by the new process are claimed to possess many advantages.

ARC WELDING — "New Advances in Arc Welding Equipment Design", by F. J. Hirner, has been issued by the Harnischfeger Corp., Milwaukee. The booklet begins with a brief resume of the history of the welding industry, and describes new developments in welding procedure. It contains an interesting explanation of relationship of volt ampere curves to arc heat, together with tables of comparisons showing micrographs and comparing open circuit voltage, arc voltage, per cent of spatter loss, per cent of elongation, and rate of deposition of various arc welders.

FURNACES — Lindberg Engineering Co., 221 North Laflin street, Chicago, has issued a 4-page bulletin describing its new line of furnaces for heat treatment. The furnaces are heated electrically and employ a new heating element in tubular form which is claimed to possess great radiating surface and strength, and in addition circulate the heat.

EYE PROTECTION — Mine Safety Appliances Co.; Braddock, Thomas and Meade streets, Pittsburgh, has issued a bulletin entitled "Eye Protection" in which eye protective equipment, including goggles, spectacles, lenses, helmets, etc., used by workers in the foundry, welding, mining, construction, steel and glass industries is described and illustrated.

ALLOYS — "High-Strength Alloys for Corrosion Resistance" is the title of a new 36-page booklet published by the Haynes Stellite Co., Kokomo, Ind. Points covered in detail are chemical and physical properties, available forms, methods of fabrication, machining and welding, and typical applications of the alloys produced by the company. Penetration rates are tabulated for a number of the highly corrosive acids.

HYGROMETERS — Brown Instrument Co., Philadelphia, has issued a 28-page catalog, No. 6702, which describes the operating principles of its recording hygrometers and psychrometers. The equipment is described and reproductions and photographs illustrate its application. A relative humidity table for use with wet and dry bulb thermometers is included.

LUBRICANT PUMPS — Pioneer Engineering & Mfg. Co., Detroit, has compiled a comprehensive 45-page engineering data book covering coolant and lubricant pumps and their correct application to machine tools and industrial processing. This data book is of the loose leaf type, and follows the standard data sheet procedure adopted by the American Society of Tool Engineers. All tables, calibrations, and statistical information are claimed to be results of operating tests on practical installations.

CORE MAKING economies follow quickly when you use durable lightweight core plates! They provide the savings that come with long, efficient service . . . the increased production that comes with easier handling.

Made of a specially treated combination of asbestos and cement, J-M Transite Core Plates are inherently durable . . . offer maximum resistance to cracking and breaking . . . are permanently free from corrosion . . . and there is little, if any, warping.

Yet, this is only half the story on Transite's contribution to lower core making costs . . .

Equally important is the fact that Transite Core Plates weigh only about a quarter as much as metal of equal thickness. Core makers actually carry *twice as many* with considerably less effort! Result . . . up goes production capacity . . . down go core making costs. For complete details, send for our free brochure. Write Johns-Manville, 22 E. 40th Street, New York City.

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TRANSITE
CORE
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Faked Foundry Facts

"Nozzle Extension"